A COMPARATIVE ANALYSIS OF THE ACHIEVEMENT IN ALGEBRA OF NEGRO AND CAUCASIAN STUDENTS IN TWO FULTON COUNTY HIGH SCHOOLS

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DEDICATION

To

My Wife

Constance Sims

for her unselfish support, patience

and understanding during the

period of my graduate

career

ACKNOWLEDGMENTS

The writer wishes to express his sincere gratitude and appreciation to all persons who contributed to the successful completion of this study. He wishes to express direct thanks to Mr. John S. Blackshear and Dr. Edward K. Weaver, advisors; to the seventy eleventh grade students who were subjects in this study; to his many friends; to Mrs. Mary Ellen James, for typing the final copy; and especially to Mr. James R. Cleveland whose understanding and encouragement throughout the period of this study gave the writer the courage to continue.

F. S.

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CHAPTER I

INTRODUCTION

Rationale

Every since the historic 1954 Supreme Court edict on school desegregation, volumes of materials have been written on both sides of the question, some in favor of and some not in favor of the edict. The chief argument of those who oppose the edict has been that the vast difference in the learning capacity of the Negro and Caucasian students will result in a lowering of educational standards of all students. The facts, however, do not support this argument. This argument has some bases only when we ignore the reasons for this difference in performance on standardized test.

When we look at the reasons for this difference, one must, I believe, come to the conclusion as this writer has, that proper education of all of America's children and re-evaluation of our educational system and its effectiveness in our society should be of major concern to all of us today.

The effect of social and economic conditions under which children are forced to live, and how they help or hinder the educational development of children is of great concern to men of good will today throughout the country.

Educators and social scientists alike agree that:

> The future of any country which is dependent on the will and wisdom of its citizens is damaged, and irreparably damaged, whenever any of its children are not educated to the fullest extent of its capacity, from grade school through graduate school.[1]

Researchers have learned that poverty and underachievement go hand in hand. They have also learned that the so-called hard core have something in common with the elegance and security of established wealth. It then becomes the duty of educators to explore that which these two groups have in common, and in some way isolate and define that which they do not have in common. There is a need to determine if there are any areas in which these differences in social and economic background affect achievement more than in others, and to isolate and define these areas.

The degree to which educators have failed to accomplish this is due, at lease in part, by the fact that such a goal is hampered by the contention of many in our educational organization that underachievement is due as much to inherited mental capacities which is different in the races, as it is to economic and social conditions. The facts, however, do not support this point of view.

> I.Q. testing is not yet developed to the place where it can be applied with dependable comparable result to persons of significantly different backgrounds. Both

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[1]U. S. Department of Health, Education and Welfare, High School Dropouts; A Twentieth Century Tragedy (Washington, D.C.: U.S.Government Printing Office, 1963), p. 2.

> I.Q. and academic achievement have been found to change with changing opportunities. So far as the results now available can show, the range of intelligence among Negroes is about the same as among whites. The academic proficiency of American Negroes seems to vary in accordance with opportunity and psychological factors having to do with motivation. (Northern Negroes score higher than southern Negroes as a whole, and Northern Negroes and whites score higher than southern whites.)[1]

All the evidence, so far as researchers know it, shows that what we call "racial" characteristics are certain visible physiological traits such as skin color and hair texture which have become somewhat specialized in certain parts of the world. All evidence, so far as researchers know it, shows that in matters of intelligence, and feelings, in the development of wisdom, kindness, social attitudes and other important matters, it is the social learning rather than inheritance, which determines what happens, and the capacity for these are distributed among all groups.

Evolution of the Problem

The idea for this study originated as a result of working with both Negro and Caucasian students in two Fulton County high schools. Experience in these two high schools has led this writer to believe that there are areas in which achievement differences may not be as great as in some others, and that computation in algebraic problems is one of these areas.

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[1] H. Harry Gills, The Integrated Classroom (New York: Basic Books, Inc., 1959), p. 138.

Statement of the Problem

The problem proposed by this study sought to answer the questions: What differences, if any, may be found in achievement in Algebra of two groups of high school students of different socio-economic and cultural backgrounds? What are the reasons, if any, for these differences in achievement in high school Algebra? Are there areas in Algebra in which these differences are greater than in others? How may these differences, if any, be remedied?

Purpose of the Study

The major purpose of this research was to appraise the Algebra achievement of the selected groups of high school students and analyze this achievement comparatively in light of differing backgrounds, social and economic.

More specifically, the purposes were characterized by the following objectives:

1. To determine the level of achievement attained by the two selected groups of high school students in Fulton County.
2. To determine the significant difference, if any, in Algebra of these two groups.
3. To investigate the factors to which these differences, if any, may be attributed:
   a. Academic and professional training of teaching personnel.
   b. What is the difference in socio-economic backgrounds of the two groups of selected students.

c. What is the difference in education and training of the parents, if any, of the two groups of students.

4. To recommend methods by which these differences, if any, be eliminated.

Limitations of the Study

This study was not concerned with any qualitative measures of the "teaching excellence" of Negro and Caucasian teaching personnel in Fulton County. The significant limitations are as follows:

1. The vast differences in the number of students enrolled in the two schools. The Negro school has an enrollment of approximately 280 students, the Caucasian school has an enrollment of approximately 990 students.
2. The basic data for this study was confined to test scores.

Contribution to Educational Knowledge

It is felt that this study was significant in that it could offer to school administrators an additional tool to be used in organizing courses for the new twelve month school program. It may establish a guide for teachers of the disadvantaged, who will be teaching for the first time children from all parts of the community and aid them in selecting an approach to activities in an intellectual area where ability and interest are criteria for success.

Locale of the Study

This research was conducted at Eva L. Thomas High School and Briarwood High School. Eva Thomas is in the southwest end of Fulton County. It serves a community which is all Negro, and the occupation of most of its residents is primarily domestic. Briarwood High is located in the southwest end of Fulton County, in the city of East Point, Georgia. It serves a community which is predominantly Caucasian and is a middle-class neighborhood. Most of the residents of this community are white collar workers.

Method of Research

The casual-comparative method of research employing the specific technique of testing and statistical analysis, was used to gather the necessary data for this study. The specific statistic used was the mean, median, standard deviation, chi square, and person, r, correlation coefficient.

Description of Subjects and Instruments

The subjects in this study were students enrolled in second year Algebra assigned to the writer at Briarwood High and the students enrolled in second year Algebra assigned to the chairman of the department of mathematics at Eva L. Thomas High School. The instruments used to gather data for this study were as follows:

1. Blyth Second-Year Algebra Test, Revised Edition, (Evaluation and Adjustment Series) 1966 Form E. Iowa University Testing Service.
2. Questionnaire of education and occupation of parents of students involved in the study.
3. Official school records.

Definition of Terms

The following definitions of terms are given for the purpose of understanding in this research:

1. "Socio-economic" as used in this study is defined as the position a person occupies on a continuum with reference to the range of salary and education of father or father person.
2. "Achievement" refers to the Algebra achievement as measured by the Blyth Second-Year Algebra Test.
3. "Intelligence" refers to the ability to learn acts, or to perform acts that are functionally useful as measured by the California Test of Mental Maturity.[1]
4. "Middle-Class" refers to people belonging to the class between the upper class and the working class. These people are business managers, physicians, lawyers, teachers and mainly white collar workers.[2]

Procedural Steps

The procedural steps used in this study are as follows:

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[1]Elizabeth T. Sullivan, Willie W. Clark, and Ernest W. Tiegs, California Short Form Test of Mental Maturity, S Form EM Revised (Philadelphia, Pennsylvania: California Test Bureau, 1963).

[2]The World Book Encyclopedia, Volume M, 1964 ed.

1. The related literature pertinent to the problem was surveyed, summarized and presented in proper form.
2. Thirty-five students were selected from Briarwood High School and thirty-five students from Eva L. Thomas High School. The two criteria for selection were willingness to cooperate and those who were enrolled in second year Algebra, during the school year of 1967 and 1968.
3. The Blyth Second-Year Algebra Test was administered to each group.
4. Statistical measures were employed to compare the groups. These measures included mean, median, standard deviation and chi square.
5. The collected data was compiled and presented in narrative and tabular form.
6. Findings, conclusions, implications and recommendations were basic to the analysis of the data.
7. School records were reviewed to obtain I.Q. scores of each group.

Survey of Related Literature

A large volume of literature on the differences in achievement between Negro and Caucasian students has been produced during the past few decades. Most of this

literature deals with differences in general rather than differences in specific areas. The literature reviewed in this study will deal with differences in general rather than in the specific area of Algebra. The related literature reviewed in this study will be presented under two headings: (1) research studies, and (2) point of view of authorities.

The evidence is now overwhelming that high intellectual potentials exist in a larger percentage of individuals from lower income and social status groups than was previously thought. In order to increase the yield of desperately needed, trained intellects from these previously deprived groups, it will be necessary to develop systematic educational programs designed to attain this specific goal. These programs must raise the aspirational levels of these children and of their parents.

> In the area of motivation, it is clear that middle-class children are more motivated to do well on examinations of the I.Q. sort because of the general emphases on success and competition in middle class life. Even where an examination is not directly related to a reward or threat, the middle class child strives to perform well. Part of the difference in I.Q. scores of middle class and deprived children is due to differences in strength of motivation to perform well on an examination rather than to differences in intelligence.[1]

This point is brought out by a study done by Dovan. In his study an examination was first given to two groups of children, one deprived and the other middle-class. It was

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[1]J. W. Wrightstone, "Social Status and Success Striving," Journal of Abnormal and Social Psychology, XXX (March, 1966), 219.

given without any indication of its importance, or of a meaningful reward for satisfactory work. The result was typical, the middle-class group showed far greater motivation than did the deprived group. Later the test was rerun, but this time a reward was offered for successful work on the test. The result: the motivation of the deprived group increased much more than the middle-class group. Thus when the test situation promised rewards that were direct and immediately practical, and meaningful, deprived children responded at a higher level than where such rewards were absent. But less so with the middle-class youth, who were more often motivated to perform at close to their maximum level even while rewards are absent.

According to an article which appeared in a recent issue of the National Education Association Journal "motivation is that which gives both direction and intensity to human behavior." In an educational context, motivation to learn is that which gives direction and intensity to students' behavior in academic situations. As Mr. Frymier stated in this article, we never actually measure a student's intelligence but only how he uses that which he has.[1]

Generally speaking, girls tend to be more positively motivated to learn than boys in school situations. Also,

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[1]Jack R. Frymier, "Motivating Students to Learn," National Education Association Journal, LXIV (February, 1968).

students from more favorable socio-economic situations are, on the average, more motivated academically than those who come from less disadvantaged circumstances. Further, motivation to learn appears typical as to be fairly constant and stable. It will change, but only slowly and over extended periods of time as a result of intensive and extensive experiences which have been induced by some factor other than the learner.

Positively motivated and negatively motivated students also differ greatly in their perception of time. The low motivated student is typically preoccupied with the present, obsessed with the past, or fearful of the future.

Change social and economic patterns in a society and you change the emphasis adolescent give to various problems and interest. This in effect is the hypothesis of a study made by Percival M. Symonds published in the September 1963 issue of the School Review, and subsequent studies with the same hypothesis in 1957. This study was concerned with helping students with their vocational and personal needs.

Recognizing the high correlation between positive motivation to learn, and socio-economic conditions, one might wonder if there are any areas in which the students' socio-economic background affects the learning process more than others. This writer believes so. Researchers agree that there is a great difference in the performance of students from two widely different backgrounds in the area of

language and in those areas where language influence performance more than in others. When the writer thinks of influences in this context, he is thinking of influences as it is reflected in test scores.

> There is increasing recognition that I.Q. scores of underprivileged children do not reflect their ability, because the test items include words that are not in the experience repertoir of these children.[1]

Intelligence tests measure how quickly people can solve relatively unimportant problems making as few errors as possible, rather than measure how people grapple with relatively important problems, making as many productive errors as necessary with time no factor.

> The existance of a special mathematical ability is more important in determining a pupil's success in the study of mathematics than his general intelligence level, his previous rate of educational progress, or his vocabulary ability.[2]

This writer is not here attempting to minimize the importance of socio-economic conditions to learning. Its importance has been pointed out in previous sections, but it is rather the contention that the ability to achieve is just as evident in the underprivileged as it is in the more affluent, this contention is supported by the achievement of

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[1]Frank Rissman, The Culturally Deprived Child (New York: Harper and Row Publishers, 1962), p. 42.

[2]Constance Z. Stafford, "A Study of Algebra Aptitude and Its Relation to Intelligence and Reading Ability of Thirty-five Eighth Grade Pupils in the David T. Howard High School, Atlanta, Georgia (unpublished Master's thesis, School of Education, Atlanta University, 1954), p. 7.

the less affluent youngsters in areas in which the influence of socio-economic conditions is less a determining factor.

> The enlarging span of apprehension is thus an important factor in the development of reasoning capacity --the solution of logical problems depend upon something more than the more retention of the individual data. The data must be grasped as a single coherent whole, each understood in its bearing upon the other. All the elementary mechanism essential to formal learning are presented before the child leaves the infant stage. Development consist primarily of an increase in the extent and variety of the subject matter to which these mechanisms can be applied. A child's reasoning ability thus appears to be a function of the organic complexities of which his attention is capable.[1]

Marked differences exist in ways of living to which children are accustomed in different social classes. Both the material and the method employed in the school are likely to conform to the upper class social classes, placing children who do not have this background at a great disadvantage. The school must study its community systematically, if it is to meet the varying needs of its pupils.[2]

After reviewing briefly the scientific evidence on race differences, the author concluded that every racial group contains individuals who are well endowed, others who are inferior, and still others who are in between. As far as the author can judge, the range of capacities and the

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[1]C. Burt, "The Development of Reasoning Ability in School Children," Journal of Pedagory and Training College Record (December, 1919), 199.

[2]Henry Maas, "Influence of Common Factors of Learning," Supplement Educational Monograph (Chicago: University of Chicago Press, 1950), p. 71.

frequency of occurrence of various levels of inherited ability are about the same in all racial groups.[1]

According to Klineberg, science ranges itself clearly and unmistakably at the side of those who maintain that any political or social action based on racism is completely unjustified. There is no proof that the groups of mankind differ in their innate mental characteristics whether in respect of intelligence or temperament, the scientific evidence indicate that the range of mental capacities in all ethnic groups is much the same.[2]

Further evidence began to accumulate, two American psychologist, Joseph Peterson and Lyle H. Lanier, became aware of the importance of comparing Negro and whites not only in situations in which their respective environments were very different, but also in situations where their environments were approximately the same. In a study published in Mental Measurement Monographs 1929, they pointed out that a useful check on the reliability of a given race difference obtained in any locality and under any specific set of circumstances is to take what seems to be fairly representative sampling from widely different environments and to compare the various results as checks upon one another with a view to determine just which factors persistently

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[1]Otto Klineberg, Race Differences: The Present Position of the Problem (New York: Harper and Brothers, 1959), p. 8.

[2]Ibid., p. 5.

yield differences in favor of one or the other race.

In line with this reasoning, they administered a number of psychological test to white and Negro boys in several cities, including Nashville (which is in the southern state of Tennessee and where Negro and white children go to separate schools), and New York (where there is a unified public school system for all children). Results showed that in Nashville there was a marked superiority of the white over the Negro children; whereas, in New York there was no significant difference between the two racial groups.[1] Here, again, we have evidence in favor of the view that, when environments are similar, the test results appear to be similar as well.

Point of View of Authorities

According to Garth, it is often difficult when we attempt to compare races because there are many things that stand in the way. It is a subject in which first impressions not based on painstaking scientific study, are very likely to be far from the mark. There are race prejudices standing in the way of a fair view of the facts. The facts themselves are often misleading. There are so many factors besides sheer mental ability that enter into the racial question. Even the personal equation, the difference

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[1] Ibid., p. 433.

between one individual and another of the same race and culture, is beset with curious influences that lower an individual's record below the level where it should be.[1]

The real problem of race psychology is to determine whether there are mental differences belonging to one of the so-called races as distinguished from one another. Are races of men equal or unequal in mental ability? In order to ascertain the facts regarding the actual situation it will be necessary to make use of scientific measurements. At the same time it will be necessary to know if the measurement is measuring what we seek to measure. If the results of the measurements are different, it must be known whether the difference is due to race, or to experience or to education. It would be absolutely necessary to control the factors of education, or nurture in both races measured, before a scientific evaluation of the results could be made. This is the most difficult phase of the problem of determination of racial differences in mental traits.[2]

> Much of the differences found in the results of studies of racial differences in mental traits is due to differences in nurtural factors and the rest is due to racial mobility, so that one race has a temporary advantage over another.[3]

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[1]Russell Thomas, A Study of Racial Mental Differences (New York: Whittlesey House McGraw-Hill Book Company, Inc., 1931), p. 207.

[2]Ibid., p. 204.

[3]Ibid., p. 221.

Knowledge of people in all parts of the world is comprehensive enough to show, too that all men living today, apart from a small proportion suffering from diseased conditions, are alike in all essential ways concerning both form and function on lower planes. We are all of the same kind, and qualities compare with distinguished realism which to our sub-groups are of minor importance compared with the innumerable qualities which all possess. This generalization applies to the forms of human beings, to the more mental of their physiological functions.

It is commonly supposed that the same generalization also applies to higher mental qualities, and that there may be group differences in degree but not in kind. Professor Klineberg takes it for granted that intelligence in a Negro is comparable in every way with intelligence in a European. The only outstanding anthropologist who question this point of view is Levy Bruhl. His thesis was that primitive thought is essentially different in kind from that of civilized man in having a different conception of individuality, and in being unable to reason in a logical way.[1]

The vague summing up of the situation regarding racial differences in mental characteristic accords with that given at the end of Professor Klineberg's book, where he writes: "As far as we can judge, the range of capacities

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[1]UNESCO, Race and Science (New York: Columbia University Press, 1961), p. 322.

and the frequency of occurrence of the various levels of inherited ability are about the same in all racial groups.[1]

If every test is "culture bound" that is to say, affected by the whole complex of previous education, training and experience, and can the use of test give us any information at all about racial differences, or similarities, in intelligence? If we cannot distinguish hereditary traits from environmental influences in the results, we can of course legitimately say that racial differences in intelligence cannot be demonstrated by means of the test, for the reasons given. We can at least say, not proven, is this all we can say or is there some more positive manner in which the test may be used to answer the questions we are raising?

Let us look at the problem a little differently. It is true that test scores obtained by different groups are due to the interaction of heredity and environmental factors which cannot be distinguished. The inferiority of one of these groups to the other may then be due to inferior heredity, or to poorer environment, or both. Suppose now we make the two environments more similar: equalize them as far as possible. If the environments become more alike, the differences in scores disappear.

If when the environments are to all practical

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[1] Ibid., p. 335.

purposes completely equalized, the differences in test scores disappear completely. We then have a strong argument in favor of the environmental, rather than the hereditary explanation of the observed differences.[1]

Whatever classification the anthropologist makes to man, he never includes mental characteristics as part of those classifications. It is now generally recognized that intelligence test do not in themselves enable us to differentiate safely between what is due to innate capacity and what is the result of environmental influences, training and education. Wherever it has been possible to make allowances for differences in environmental opportunities, the test have shown essential similarities in mental abilities among all human groups. In short, given similar degrees of cultural opportunity to realize their potentialities, the average achievement of the members of each ethnic group is about the same.

The scientific material available to us at the present does not justify the conclusion that inherited genetic differences are a major factor in producing the differences between the cultures and cultural achievements of different people or groups. It does indicate, however, that the history of the cultural experiences which each group has

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[1]Montagu Ashley, Man's Most Dangerous Myth (New York: World Publishing Company, 1964), p. 363.

undergone is the major factor in explaining such differences. The one trait which above all others has been at a premium in the evolution of man's mental characters has been educatibility. This is a trait which all human beings possess. It is, indeed, a species character of Homo Sapians.[1]

For this reason and other, then, it would seem at least to the writer, that the differences in academic success is due to some thing other than racial factors. According to a study done by Clark and Plotkin, academic success is seen to be a direct function of the father's occupation. Fathers in Group B are professionals in 15.9 per cent of the cases and 29.6 per cent in blue collar occupations. Group C has 11.7 per cent in the professionals and 41.3 per cent in blue collar professions, while the DNC (students who did not complete the first college entered) has lowest professional (8.8 per cent) and highest blue collar (50.0 per cent).

If neither parent attended college, there is a much greater likelihood that the child will not complete college successfully; 61.4 per cent of the DNC report that neither parent attended college compared with 36.7 per cent and 48.4 per cent in groups B and C.

When both parents attended college and at least one received a degree, there is a linear relationship to college

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[1] Ibid.

performance; 22.9 per cent in group B, 17.2 per cent in group C, and only 10.4 per cent in the DNC group.[1]

According to Clark, the central questions that lie behind the entire network of problems are these: Are Negroes such--in terms of innate incapacity or environmental deprivation--that their children are less capable of learning than are whites, so that any school that is permitted to become integrated necessarily decline in quality? Or, has inferior education been systematically imposed on Negro children--a performance that could be reversed with quality education? The answer to these questions is of fundamental importance because the flight of whites from the urban public school system in many American cities is based on the belief that the first is true and the second false. If the first is false and the second true and the centers of power in the white community can be convinced of that fact--one of the basic injustices in American life could be corrected.[2]

There are many things that seem to point to the conclusion that the second may be true. Noar points out in her book, the fact that there are many factors that achievement, but one serious effect on development of intelligence is the negative self-image which carries with it belief that the

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[1]Kenneth B. Clark and Lawerence Plotkin, The Negro Student at Integrated Colleges (New York: The City University Press, 1963), pp. 19-20.

[2]Kenneth B. Clark, Dark Ghetto Dilemmas of Social Power (New York: Harper and Row Company, 1965), p. 112

self is inferior. Educators are assured by psychiatrists that the individual behaves as he perceives himself to be. This belief in his inferiority depresses achievement in test taking and in school situations in which a Negro is in competition with whites. Moreover, lack of self-confidence and fear of increasing hostility by being superior create anxiety which interferes with performance. Dr. Pettigrew says that achieving a high test score does not have the same meaning for a lower-status Negro child (as it does for a white middle-class child), and it may even carry a definite connotation of personal threat...scoring low may for some talented Negro children be a rational response to perceived danger.[1]

The raising of the aspirational level of the socio-economic deprived children then, should be the goal of every intelligent concerned individual. Our nation will begin to decline in strength and nobility of purpose, and could eventually fall, unless we take care to conserve and develop our most precious, and altogether indispensable, resource--the youth of this nation.

On this point, President John F. Kennedy said:

> Our progress as a nation can be no swifter than our progress in education. Our requirement for world leadership, our hopes for economic growth, and the demands of

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[1]Gertrude Noar, The Teacher and Integration (Washington, D.C.: Student National Education Association Press, 1967), p. 63.

citizenship itself in an era such as this all require the maximum development of every young American's capacity. The human mind is our fundamental resource.[1]

[1] Ibid., p. 66.

CHAPTER II

PRESENTATION AND ANALYSIS OF DATA

Introduction

This chapter presents the data obtained from the administration of the California Test of Mental Maturity, Short Form, 1963 revised edition, and the Blyth Second Year Algebra Test, Form E, revised edition.

The data collected were treated statistically, then presented in proper tables, analyzed and interpreted.

1. Distribution of intelligence quotient and the significance of their differences for both Negro and Caucasian students.
2. Distribution of Algebra performance raw scores and the significance of their differences.
3. Distribution of performance of Negro and Caucasian students on the components of the Algebra test.

Furthermore, these data were analyzed and interpreted at critical ratio of 2.58 at the one per cent level of confidence and appropriate degrees of freedom for all "t" ratios. The "t" was for the significance of the differences between means for the significance of correlation

coefficients and for the significance of the difference between correlation coefficients.

Results of the California Mental Maturity Test

The data on the California Test of Mental Maturity as revealed by the raw score obtained by thirty-five students comprising the two groups of "Negro" and Caucasian students of the Eva L. Thomas High School and the Briarwood High School, College Park and East Point, Georgia, respectively, are presented in Table 1.

Negro students

The data on the California Test of Mental Maturity for the Negro students indicated a range from a low of 78 to a high of 119, with a mean of 97.85, a median of 98.87, a standard deviation of 10.05, and a standard error of the mean of 1.76. Further, Table 1 reveals that 49 per cent scored above the mean, 40 per cent scored below the mean, and 11 per cent scored within the mean class interval. The mean score of 97.85 indicated that these students were slightly below the norm of expectancy in intelligence.

Caucasian students

The data on the California Test of Mental Maturity for the Caucasian students indicated a range from a low of 87, to a high of 143, with a mean of 110.16, a median of 110.95, a standard deviation of 10.5, and a standard error

TABLE 1.--Frequency distribution of the raw score as obtained by thirty-five Negro students and thirty-five Caucasian students on the California Test of Mental Maturity, Short Form, 1963 revised edition

Raw Score	Negro Students		Caucasian Students	
	Number	Per Cent	Number	Per Cent
140 - 144	0	0.00	1	3.00
135 - 139	0	0.00	0	0.00
130 - 134	0	0.00	0	0.00
125 - 129	0	0.00	2	6.00
120 - 124	0	0.00	2	6.00
115 - 119	3	9.00	5	14.00
110 - 114	3	9.00	10	28.00
105 - 109	11	31.00	2	6.00
100 - 104	4	11.00	9	25.00
95 - 99	6	17.00	2	6.00
90 - 94	5	14.00	1	3.00
85 - 89	1	3.00	1	3.00
80 - 84	1	3.00	0	0.00
74 - 79	1	3.00	0	0.00
Total	35	100.00	35	100.00
Mean	97.85		110.16	
Median	98.87		110.95	
Sigma	10.05		10.50	
S.E.M.	1.72		1.80	

of the mean of 1.80. Further, Table 1 reveals that 29 per cent scored above the mean, 57 per cent scored below the mean, and 28 per cent scored within the mean class interval. The mean score of 110.16 indicated that these students scored slightly above the norm of expectancy in intelligence.

The "t" Ratio of Comparative Data

Table 2 shows that the comparative measures for the

two groups were as follows: the mean was 97.85 and 110.16 for Negro students and Caucasian students, respectively, with a difference of 12.31 in favor of the Caucasian students. The median was 98.87 and 110.95 for the Negro and Caucasian students, respectively, with a difference of 12.08 in favor of the Caucasian students. The standard deviation was 10.05 and 10.50 for Negro students and Caucasian students, respectively, with a difference of .95 in favor of the Caucasian students. The standard error of the mean was 1.72 and 1.80 for the Negro students and Caucasian students, respectively, with a difference of .08 in favor of the Negro students. The standard error of the difference between the mean was 2.5.

TABLE 2.--A comparative analysis of the raw score as obtained by thirty-five Negro students and thirty-five Caucasian students on the California Test of Mental Maturity, Short Form E.M., 1963 revised edition

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$_{M_1}S.E._{M_2}$	t
Negro	97.85	10.05	1.76			
				12.31	2.5	4.9
Caucasian	110.16	10.50	1.80			

The "t" for these data was 4.9, which was significant for it was greater than 2.58 at the (.01) per cent level of confidence with 68 degrees of freedom. The difference on the California Test of Mental Maturity was significant

for the two groups of students.

Results of Negro and Caucasian Girls on the California Test of Mental Maturity

The data on the California Test of Mental Maturity as revealed by the raw score obtained by twenty Negro girls and seventeen Caucasian girls of the Eva L. Thomas High School and the Briarwood High School, College Park and East Point, Georgia, respectively, are presented in Table 3.

Negro girls

The data on the California Test of Mental Maturity for the Negro students indicated a range from a low of 80, to a high of 119, with a mean of 98.75, a median of 99.50, a standard deviation of 5.95 and a standard error of the mean of 1.36. Further, Table 3 reveals that 50 per cent scored above the mean, 40 per cent scored below the mean, and 10 per cent scored within the mean class interval. The mean score of 98.75 indicated that these students scored slightly below the norm of expectancy in intelligence.

Caucasian girls

The data on the California Test of Mental Maturity for the Caucasian girls indicated a range from a low of 89 to a high of 118, with a mean of 103.87, a median of 103, a standard deviation of 9.99. Further, Table 3 revealed that 46 per cent scored above the mean, 48 per cent scored below the mean and 6 per cent scored within the mean class

interval. The mean score of 103.87 indicate that these students scored at the level of expectancy in intelligence.

TABLE 3.--Frequency distribution of the raw score as obtained by twenty Negro girls and seventeen Caucasian girls on the California Test of Mental Maturity, Short Form E.M., revised edition 1963

Raw Scores	Negro Girls		Caucasian Girls	
	Number	Per Cent	Number	Per Cent
140 - 144	0	0.00	0	0.00
135 - 139	0	0.00	0	0.00
130 - 134	0	0.00	0	0.00
125 - 129	0	0.00	0	0.00
120 - 124	0	0.00	0	0.00
115 - 119	3	15.00	3	17.65
110 - 114	0	0.00	3	17.65
105 - 109	1	5.00	2	11.77
100 - 104	6	30.00	4	23.52
95 - 99	2	10.00	0	0.00
90 - 94	4	20.00	4	23.52
85 - 89	3	15.00	1	5.89
80 - 84	1	5.00	0	0.00
74 - 79	0	0.00	0	0.00
Total	20	100.00	17	100.00
Mean	98.75		103.87	
Median	99.5		103.0	
Sigma	5.95		9.99	
S.E.M.	1.36		2.49	

The "t" Ratio of Comparative Data

Table 4 shows that the comparative measures for the two groups were as follows: the mean was 98.76 and 103.87 for Negro students and Caucasian students, respectively, with a difference of 5.11 in favor of the Caucasian girls.

The median was 99.5 and 103.0 for the Negro and Caucasian students, respectively, with a difference of 3.5 in favor of the Caucasian girls. The standard deviation was 5.95 and 9.99 for Negro students and Caucasian students, respectively, with a difference of 4.04 in favor of the Caucasian girls. The standard error of the mean was 1.36 and 2.49 for the Negro students and Caucasian students, respectively, with a difference of 1.13 in favor of the Caucasian girls. The standard error of the difference between the mean was 2.83.

TABLE 4.--Comparative analysis of the raw score as obtained by twenty Negro girls and seventeen Caucasian girls on the California Test of Mental Maturity, Short Form, 1963 revised edition

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Negro	98.75	5.95	1.36			
				5.12	2.83	1.8
Caucasian	103.87	9.95	2.49			

The "t" for these data was 1.8, which was not significant for it was less than 2.58 at the (.01) per cent level of confidence with 35 degrees of freedom. The difference on the California Test of Mental Maturity was not significant for the two groups of students.

Results of Negro and Caucasian Boys on the California Test of Mental Maturity

The data on the California Test of Mental Maturity

as revealed by the raw scores obtained by fifteen Negro boys and eighteen Caucasian boys of the Eva L. Thomas High School and the Briarwood High School, College Park and East Point, Georgia, respectively, are presented in Table 5.

TABLE 5.--Frequency distribution of the raw score as obtained by fifteen Negro boys and eighteen Caucasian boys on the California Test of Mental Maturity, Short Form, 1963 revised edition

Raw Scores	Negro Boys		Caucasian Boys	
	Number	Per Cent	Number	Per Cent
145 - 149	0	0.00	1	6.00
140 - 144	0	0.00	0	0.00
135 - 139	0	0.00	0	0.00
130 - 134	0	0.00	0	0.00
125 - 129	0	0.00	1	6.00
120 - 124	0	0.00	1	6.00
115 - 119	0	0.00	2	11.00
110 - 114	0	0.00	4	22.00
105 - 109	2	13.33	0	0.00
100 - 104	7	46.67	8	43.00
95 - 99	2	13.33	1	6.00
90 - 94	2	13.33	0	0.00
85 - 89	1	6.67	0	0.00
80 - 84	1	6.67	0	0.00
74 - 79	0	0.00	0	0.00
Total	15	100.00	18	100.00
Mean	91.4		110.7	
Median	98.0		109.5	
Sigma	7.38		11.30	
S.E.M.	1.97		2.74	

Negro boys

The data on the California Test of Mental Maturity

for the Negro students indicated a range from a low of 82 to a high of 109, with a mean score of 91.4, a median score of 98, a standard deviation of 7.38, and a standard error of the mean of 1.97. Further, Table 5 reveals that 59 per cent scored above the mean, 34 scored below the mean, and 7 per cent scored within the mean class interval. The mean score of 91.4 indicated that these students scored slightly below the norm of expectancy in intelligence.

Caucasian boys

The data on the California Test of Mental Maturity for the Caucasian boys indicated a range from a low of 97 to a high of 143, with a mean of 110.7, a median of 109.5, a standard deviation of 11.30, and a standard error of the mean of 2.74. Further, Table 5 reveals that 29 per cent scored above the mean, 49 per cent scored below the mean, and 22 per cent scored within the mean class interval. The mean score of 110.7 indicated that these students scored slightly above the norm of expectancy in intelligence.

The "t" Ratio of Comparative Data

Table 6 shows that the comparative measures for the two groups were as follows: the mean was 91.4 and 110.7 for Negro students and Caucasian students, respectively, with a difference of 29.3 in favor of the Caucasian boys. The median was 98.0 and 109.5 for the Negro and Caucasian students, respectively, with a difference of 11.5 in favor of

the Caucasian boys. The standard deviation was 7.38 and 11.30 for Negro students and Caucasian students, respectively, with a difference of 3.92 in favor of the Caucasian boys. The standard error of the mean was 1.97 and 2.74 for the Negro students and Caucasian students, respectively, with a difference of .77 in favor of the Caucasian boys. The standard error of the difference between the mean was 3.37.

TABLE 6.--Comparative analysis of the raw score as obtained by fifteen Negro boys and eighteen Caucasian boys on the California Test of Mental Maturity, Short Form, 1963 Revised Edition

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$S.E._{M_1 - M_2}$	t
Negro	91.4	7.38	1.97			
				9.3	3.37	2.76
Caucasian	110.7	11.3	2.74			

The "t" for these data was 2.76, which was significant for it was greater than 2.58 at the (.01) per cent level of confidence with 31 degrees of freedom. The difference on the California Test of Mental Maturity was significant for the two groups of students.

Results of the Performance of Negro and Caucasian Students on the Blyth Second Year Algebra Test

The data on the Total Section of the Blyth Second Year Algebra Test revealed by the raw scores obtained by 35

Negro students and 35 Caucasian students of the Eva L. Thomas High School, and Briarwood High School, College Park, and East Point, Georgia, respectively, are presented in Table 7.

TABLE 7.--Frequency distribution of the raw scores as obtained by thirty-five Negro students and thirty-five Caucasian students on the Blyth Second Year Algebra Test, Form E

Raw Scores	Negro Students		Caucasian Students	
	Number	Per Cent	Number	Per Cent
35 - 39	1	3.00	3	8.57
30 - 34	3	9.00	2	5.71
25 - 29	6	17.00	3	8.57
20 - 24	5	14.00	11	31.43
15 - 19	10	28.00	13	37.14
10 - 14	9	26.00	3	8.57
5 - 9	1	3.00	0	0.00
Total	35	100.00	35	100.00
Mean	19.71		21.57	
Median	18.30		20.17	
Sigma	7.30		6.69	
S.E.M.	1.25		1.13	

Negro students

The data on the Total Section of the Blyth Second Year Algebra Test for the Negro students indicated a range from a low of 9 to a high of 36, with a mean of 19.71, a

median of 18.30, a standard deviation of 7.30, and a standard error of the mean of 1.25. Further, Table 7 reveals that 43 per cent scored above the mean, 29 per cent scored below the mean, and 28 per cent scored within the mean class interval.

Caucasian students

The data on the Components Section of the Blyth Second Year Algebra Test for the Caucasian students ranged from a low of 10 to a high of 39, with a mean of 21.57, a median of 20.17, a standard deviation of 6.69, a standard error of the mean of 1.13. Further, Table 7 reveals that 22.86 per cent scored above the mean, 45.71 per cent scored below the mean, and 31.43 per cent scored within the mean class interval.

The "t" Ratio of Comparative Data

Table 8 shows that the comparative measures for the two groups were as follows: the mean was 19.71 and 21.57 for Negro students and Caucasian students, respectively, with a difference of 1.86 in favor of the Caucasian students. The median was 18.30 and 20.17 for the Negro and Caucasian students, respectively, with a difference of 1.77 in favor of the Caucasian students. The standard deviation was 7.30 and 6.69 for Negro students and Caucasian students, respectively, with a difference of .61 in favor of the Negro students. The standard error of the mean was 1.25 and 1.13 for the Negro

students and Caucasian students, respectively, with a difference of .12 in favor of the Caucasian students. The standard error of the difference between the mean was 1.68.

TABLE 8.--Comparative analysis of the raw scores as obtained by thirty-five Negro students and thirty-five Caucasian students on the Blyth Second Year Algebra Test, Form E

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Negro	19.71	7.30	1.25			
				1.86	1.68	1.09
Caucasian	21.57	6.69	1.13			

The "t" for these data was 1.09, which was not significant for it was less than 2.58 at the (.01) per cent level of confidence with 68 degrees of freedom. The difference on the Total Test of the Blyth Second Year Algebra Test was not significant for the two groups of students.

Results of the Performance of Negro and Caucasian Students on the Computation Section of the Blyth Second Year Algebra Test

The data on the Computation Section of the Blyth Second Year Algebra Test revealed by the raw scores obtained by thirty-five Negro students and thirty-five Caucasian students of the Eva L. Thomas High School, and Briarwood High School, College Park, and East Point, Georgia, respectively, are presented in Table 9.

TABLE 9.--Frequency distribution of the raw scores as obtained by thirty-five Negro students and thirty-five Caucasian students on the computation section of the Blyth Second Year Algebra Test, Form E

Raw Scores	Negro Students		Caucasian Students	
	Number	Per Cent	Number	Per Cent
13 - 16	2	6.00	2	6.00
10 - 12	10	29.00	6	17.00
7 - 9	8	22.00	13	37.00
4 - 6	12	34.00	13	37.00
1 - 3	3	9.00	1	3.00
Total	35	100.00	35	100.00
Mean	6.8		7.53	
Median	7.5		7.30	
Sigma	3.81		2.76	
S.E.M.	.653		.473	

Negro students

The data on the Computation Section of the Blyth Second Year Algebra Test for the Negro students indicated a range from a low of 3 to a high of 14, with a mean of 6.8, a median of 7.5, a standard deviation of 3.81, and a standard error of the mean of .653. Further, Table 9 reveals that 57 per cent scored above the mean, 9 per cent scored below the mean, and 34 per cent scored within the mean class interval.

Caucasian students

The data on the Computation Section of the Blyth Second Year Algebra Test for the Caucasian students ranged from a low of 3 to a high of 14, with a mean of 7.57, a median of 7.30, a standard deviation of 2.76, a standard error of the mean of .473. Further, Table 9 reveals that 53 per cent scored above the mean, 40 per cent scored below the mean, and 37 per cent scored within the mean class interval.

The "t" Ratio of Comparative Data

Table 10 shows that the comparative measures for the two groups were as follows: the mean was 6.8 and 7.53 for Negro students and Caucasian students, respectively, with a difference of .73 in favor of the Caucasian students. The median was 7.50 and 7.30 for the Negro and Caucasian students, respectively, with a difference of .20 in favor of the Negro students. The standard deviation was 3.81 and 2.76 for Negro students and Caucasian students, respectively, with a difference of 1.05 in favor of the Caucasian students. The standard error of the mean was .653 and .473 for the Negro students and Caucasian students, respectively, with a difference of .180 in favor of the Caucasian students. The standard error of the difference between the mean was .861.

The "t" for these data was .08, which was

significant for it was greater than 2.58 at the (.01) per cent level of confidence with 68 degrees of freedom. The difference on the Computation section of the Blyth Second Year Algebra Test was significant for the two groups of students.

TABLE 10.--Comparative analysis of the raw scores as obtained by thirty-five Negro students and thirty-five Caucasian students on the Computation Section of the Blyth Second Year Algebra Test, Form E

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Negro	6.8	3.81	.653			
				.73	.861	.08
Caucasian	7.53	2.76	.473			

Results of the Performance of Negro and Caucasian Girls on the Computation Section of the Blyth Second Year Algebra Test

The data on the Computation Section of the Blyth Second Year Algebra Test revealed by the raw scores obtained by twenty Negro girls and seventeen Caucasian girls of the Eva L. Thomas and Briarwood High Schools, College Park, and East Point, Georgia, respectively, are presented in Table 11.

Negro girls

The data on the Computation Section of the Blyth Second Year Algebra Test for the Negro girls indicated a

TABLE 11.--Frequency distribution of the raw scores as obtained by twenty Negro girls and seventeen Caucasian girls on the Computation Section of the Blyth Second Year Algebra Test, Form E

Raw Scores	Negro Girls		Caucasian Girls	
	Number	Per Cent	Number	Per Cent
13 - 15	1	5.00	1	11.11
10 - 12	8	40.00	3	16.67
7 - 9	1	5.00	8	44.44
4 - 6	9	45.00	5	27.78
0 - 3	1	5.00	0	0.00
Total	20	100.00	17	100.00
Mean	7.85		6.76	
Median	6.50		6.30	
Sigma	3.33		7.98	
S.E.M.	.765		1.99	

range from a low of 3 to a high of 14, with a mean of 7.85, a median of 6.5, a standard deviation of 3.33, and a standard error of the mean of .763. Further, Table 11 reveals that 45 per cent scored above the mean, 50 per cent scored below the mean, and 5 per cent scored within the mean class interval.

Caucasian girls

The data on the Computation Section of the Blyth Second Year Algebra Test for the Caucasian girls ranged from

a low of 3 to a high of 11, with a mean of 6.76, a median of 6.31, a standard deviation of 7.98, a standard error of the mean of 1.99. Further, Table 11 reveals that 47 per cent scored above the mean, 6 per cent scored below the mean, and 47 per cent scored within the mean class interval.

The "t" Ratio of Comparative Data

Table 12 shows that the comparative measures for the two groups were as follows: the mean was 7.85 and 6.76 for Negro students and Caucasian students, respectively, with a difference of 1.09 in favor of the Negro girls. The median was 6.50 and 6.30 for the Negro and Caucasian students, respectively, with a difference of .20 in favor of the Negro girls. The standard deviation was 3.33 and 7.98 for Negro students and Caucasian students, respectively, with a difference of 4.65 in favor of the Negro girls. The standard

TABLE 12.--Comparative analysis of the raw scores as obtained by twenty Negro girls and seventeen Caucasian girls on the Computation Section of the Blyth Second Year Algebra Test, Form E

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Negro	7.85	3.33	.765			
				1.09	2.13	.51
Caucasian	6.76	7.98	1.99			

error of the mean was .765 and 1.99 for the Negro students

and Caucasian students, respectively, with a difference of .225 in favor of the Negro girls. The standard error of the difference between the mean was 2.13.

The "t" for these data was .51, which was not significant for it was less than 2.58 at the (.01) per cent level of confidence with 35 degrees of freedom. The difference on the Computation Section of the Blyth Second Year Algebra Test was not significant for the two groups of students.

Results of the Performance of Negro and Caucasian Boys on the Computation Section of the Blyth Second Year Algebra Test

The data on the Computation Section of the Blyth Second Year Algebra Test revealed by the raw scores obtained by fifteen Negro Boys and eighteen Caucasian boys of the Eva L. Thomas High School, and Briarwood High School, College Park and East Point, Georgia, respectively, are presented in Table 13.

Negro boys

The data on the Computation Section of the Blyth Second Year Algebra Test for the Negro boys indicated a range from a low of 3 to a high of 11, with a mean of 7, a median of 8, a standard deviation of 4.17, and a standard error of the mean of 1.11. Further, Table 13 reveals that 13 per cent scored above the mean, 40 per cent scored below

the mean, and 47 per cent scored within the mean class interval.

TABLE 13.--Frequency distribution of raw scores as obtained by fifteen Negro boys and eighteen Caucasian boys on the computation section of the Blyth Second Year Algebra Test, Form E

Raw Scores	Negro Boys		Caucasian Boys	
	Number	Per Cent	Number	Per Cent
13 - 15	0	0.00	2	11.11
10 - 12	2	13.00	3	11.67
7 - 9	7	47.00	8	44.44
4 - 6	3	20.00	5	27.78
0 - 3	3	20.00	0	0.00
Total	15	100.00	18	100.00
Mean	7.0		8.5	
Median	8.0		8.5	
Sigma	4.17		2.70	
S.E.M.	1.11		.665	

Caucasian boys

The data on the Computation Section of the Blyth Second Year Algebra Test for the Caucasian boys ranged from a low of 6 to a high of 14, with a mean of 8.5, a median of 8.5, a standard deviation of 2.70, a standard error of the mean of .665. Further, Table 13 reveals that 28 per cent scored above the mean, 50 per cent scored below the mean and 22 per cent scored within the mean class interval.

The "t" Ratio of Comparative Data

Table 14 shows that the comparative measures for the two groups were as follows: the mean was 7.0 and 6.76 for Negro students and Caucasian students, respectively, with a difference of .24 in favor of the Negro boys. The median was 8.0 and 8.5 for the Negro students and the Caucasian students, respectively, with a difference of .5 in favor of the Caucasian boys. The standard deviation was 4.17 and 2.70 for the Negro students and Caucasian students, respectively, with a difference of 1.47 in favor of the Caucasian boys. The standard error of the mean was 1.11 and .665 for the Negro students and the Caucasian students, respectively, with a difference of .445 in favor of the Caucasian boys. The standard error of the difference between the two means was 2.28.

TABLE 14.--Comparative analysis of the raw scores as obtained by fifteen Negro boys and eighteen Caucasian boys on the Computation Section of the Blyth Second Year Algebra Test, Form E

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Negro	7.0	4.17	1.11			
				.24	2.28	.10
Caucasian	6.76	7.98	1.99			

The "t" for these data was .10, which was not significant for it was less than 2.58 at the (.01) per cent

level of confidence with 31 degrees of freedom. The difference on the Computation Section of the Blyth Second Year Algebra Test was not significant for the two groups of students.

Results of the Performance of Negro and Caucasian Girls on the Problem Solving Section of the Blyth Second Year Algebra Test

The data on the Problem Solving Section of the Blyth Second Year Algebra Test revealed by the raw scores obtained by twenty Negro girls and seventeen Caucasian girls of the Eva L. Thomas High School and Briarwood High School, College Park, and East Point, Georgia, respectively, are presented in Table 15.

Negro girls

The data on the Problem Solving Section of the Blyth Second Year Algebra Test for the Negro girls indicated a range from a low of 6 to a high of 26, with a mean of 12.5, a median of 10.5, a standard deviation of 6.48, and a standard error of the mean of 1.46. Further, Table 15 reveals that 40 per cent scored above the mean, 50 per cent scored below the mean, and 10 per cent scored within the mean class interval.

Caucasian girls

The data on the Problem Solving Section of the Blyth Second Year Algebra Test for the Caucasian girls ranged from

TABLE 15.--Frequency distribution of raw scores as obtained by twenty Negro girls and seventeen Caucasian girls on the Problem Solving Section of the Blyth Second Year Algebra Test, Form E

Raw Scores	Negro Girls		Caucasian Girls	
	Number	Per Cent	Number	Per Cent
26 - 28	1	5.00	0	0.00
23 - 25	0	0.00	1	6.00
20 - 22	4	20.00	1	6.00
17 - 19	1	5.00	2	12.00
14 - 16	2	10.00	4	23.00
11 - 13	2	10.00	2	12.00
8 - 10	4	20.00	4	23.00
5 - 7	6	30.00	3	18.00
Total	20	100.00	17	100.00
Mean	12.5		12.64	
Median	10.5		13.00	
Sigma	6.48		5.22	
S.E.M.	1.46		1.30	

a low of 6 to a high of 24, with a mean of 12.64, a median of 13, a standard deviation of 5.22, a standard error of the mean of 1.30. Further, Table 15 reveals that 47 per cent scored above the mean, 41 per cent scored below the mean, and 12 per cent scored within the mean class interval.

The "t" Ratio of Comparative Data

Table 16 shows that the comparative measures for the two groups were as follows: the mean was 12.5 and 12.64 for Negro students and Caucasian students, respectively, with a difference of .14 in favor of the Caucasian girls. The median was 10.5 and 13.0 for the Negro students and the Caucasian students, respectively, with a difference of 2.5 in favor of the Caucasian girls. The standard deviation was 6.48 and 5.22 for the Negro students and Caucasian students, respectively, with a difference of 1.26 in favor of the Caucasian girls. The standard error of the mean was 1.46 and 1.30 for the Negro students and the Caucasian students, respectively, with a difference of .10 in favor of the Caucasian girls. The standard error of the difference between the two means was 1.95.

TABLE 16.--Comparative analysis of the raw scores as obtained by twenty Negro girls and seventeen Caucasian girls on the Problem Solving Section of the Blyth Second Year Algebra Test, Form E

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Negro	12.50	6.48	1.46			
				.14	1.95	.07
Caucasian	12.64	5.22	1.30			

The "t" for these data was .07, which was not significant for it was less than 2.58 at the (.01) per cent

level of confidence with 35 degrees of freedom. There, the difference on Problem Solving Section of the Blyth Second Year Algebra Test was not significant for the two groups of students.

Results of the Performance of Negro and Caucasian Students on the Problem Solving Section of the Blyth Second Year Algebra Test

The data on the Problem Solving Section of the Blyth Second Year Algebra Test revealed by the raw scores obtained by thirty-five Negro students and thirty-five Caucasian students of the Eva L. Thomas High School and Briarwood High School, College Park and East Point, Georgia, respectively, are presented in Table 17.

Negro students

The data on the Problem Solving Section of the Blyth Second Year Algebra Test for the Negro students indicated a range from a low of 9 to a high of 35, with a mean of 12.77, a median of 11.62, a standard deviation of 5.76, and a standard error of the mean of .987. Further, Table 17 reveals that 42.88 per cent scored below the mean, 45.70 per cent scored below the mean, and 11.42 per cent scored within the mean class interval.

Caucasian students

The data on the Problem Solving Section of the Blyth Second Year Algebra Test for the Caucasian students ranged

TABLE 17.--Frequency distribution of the raw scores as obtained by thirty-five Negro students and thirty-five Caucasian students on the Problem Solving Section of the Blyth Second Year Algebra Test, Form E

Raw Scores	Negro Students		Caucasian Students	
	Number	Per Cent	Number	Per Cent
26 - 28	1	2.85	1	2.85
23 - 25	0	0.00	2	5.71
20 - 22	5	14.28	1	2.85
17 - 19	4	11.42	4	11.42
14 - 16	5	14.28	5	14.28
11 - 13	4	11.42	12	34.28
8 - 10	8	22.85	7	20.00
5 - 7	8	22.85	3	8.57
Total	35	100.00	35	100.00
Mean	12.77		13.37	
Median	11.62		12.37	
Sigma	5.76		1.25	
S.E.M.	.987		.214	

from a low of 10 to a high of 42, with a mean of 13.37, a median of 12.37, a standard deviation of 1.25, a standard error of the mean of .214. Further, Table 17 reveals that 37.15 per cent scored above the mean, 28.57 per cent scored below the mean, and 34.28 per cent scored within the mean class interval.

The "t" Ratio of Comparative Data

Table 18 shows that the comparative measures for the two groups were as follows: the mean was 12.77 and 13.37 for Negro students and Caucasian students, respectively, with a difference of .60 in favor of the Caucasian students. The median was 11.62 and 12.37 for the Negro students and the Caucasian students, respectively, with a difference of .75 in favor of the Caucasian students. The standard deviation was 5.76 and 1.25 for the Negro students and Caucasian students, respectively, with a difference of 4.51 in favor of the Caucasian students. The standard error of the mean was .987 and .214 for the Negro students and the Caucasian students, respectively, with a difference of .773 in favor of the Caucasian students. The standard error of the difference between the two means was 1.01.

TABLE 18.--Comparative analysis of the raw score as obtained by thirty-five Negro students and thirty-five Caucasian students on the Problem Solving Section of the Blyth Second Year Algebra Test, Form E

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Negro	12.77	5.76	.987			
				.60	1.01	.593
Caucasian	13.37	1.25	.214			

The "t" for these data was .593, which was not significant for it was less than 2.58 at the (.01) per cent

level of confidence with 68 degrees of freedom. There, the difference on the Problem Solving Section of the Blyth Second Year Algebra Test was not significant for the two groups of students.

Results of the Performance of Negro and Caucasian Boys on the Problem Solving Section of the Blyth Second Year Algebra Test

The data on the Problem Solving Section of the Blyth Second Year Algebra Test revealed by the raw scores obtained by fifteen Negro boys and eighteen Caucasian boys of the Eva L. Thomas High School and Briarwood High School, College Park and East Point, Georgia, respectively, are presented in Table 19.

Negro boys

The data on the Problem Solving Section of the Blyth Second Year Algebra Test for the Negro boys indicated a range from a low of 7 to a high of 20, with a mean of 12.6, a median of 12.7, a standard deviation of 7.7 and a standard error of the mean of 2.07. Further, Table 19 reveals that 47 per cent scored above the mean, 40 per cent scored below the mean and 13 per cent scored within the mean class interval.

Caucasian boys

The data on the Problem Solving Section of the Blyth Second Year Algebra Test for the Caucasian boys ranged from

a low of 9 to a high of 27, with a mean of 13.83, a median of 12.3, a standard deviation of 4.56, a standard error of the mean of 1.10. Further, Table 19 reveals that 29 per cent scored above the mean, 16 per cent scored below the mean, and that 55 per cent scored within the mean class interval.

TABLE 19.--Frequency distribution of the raw scores as obtained by fifteen Negro boys and eighteen Caucasian boys on the Problem Solving Section of the Blyth Second Year Algebra Test, Form E

Raw Scores	Negro Boys		Caucasian Boys	
	Number	Per Cent	Number	Per Cent
26 - 28	0	0.00	1	6.00
23 - 25	0	0.00	1	6.00
20 - 22	1	7.00	0	0.00
17 - 19	3	20.00	2	11.00
14 - 16	3	20.00	1	6.00
11 - 13	2	13.00	10	55.00
8 - 10	3	20.00	3	16.00
5 - 7	3	20.00	0	0.00
Total	15	100.00	18	100.00
Mean	12.60		13.83	
Median	12.70		12.30	
Sigma	7.70		4.56	
S.E.M.	2.07		1.10	

The "t" Ratio of Comparative Data

Table 20 shows that the comparative measures for the two groups were as follows: the mean was 12.6 and 13.83 for Negro students and Caucasian students, respectively, with a difference of 1.23 in favor of the Caucasian boys. The median was 12.7 and 12.3 for the Negro students and the Caucasian students, respectively, with a difference of .4 in favor of the Negro boys. The standard deviation was 7.7 and 4.56 for the Negro students and Caucasian students, respectively, with a difference of 3.14 in favor of the Caucasian boys. The standard error of the mean was 2.04 and 1.10 for the Negro students and the Caucasian students, respectively, with a difference of .97 in favor of the Caucasian boys. The standard error of the difference between the two means was 2.23.

TABLE 20.--Comparative analysis of the raw scores as obtained by fifteen Negro boys and eighteen Caucasian boys on the Problem Solving Section of the Blyth Second Year Algebra Test, Form E

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Negro	12.60	7.7	2.04			
				1.23	2.23	.551
Caucasian	13.83	4.56	1.10			

The "t" for these data was .551, which was not significant for it was less than 2.58 at the (.01) per cent

level of confidence with 31 degrees of freedom. There, the difference on the Problem Solving Section of the Blyth Second Year Algebra Test was not significant for the two groups of students.

Annual Salary of Father or Father Person of Negro and Caucasian Students

Data regarding annual salary range of father or father person of the two groups of students is given in Table 21 for the parent of thirty-five Negro students and the parents of thirty-five Caucasian students.

TABLE 21.--Status of annual salary range of father or father person of thirty-five Negro students and thirty-five Caucasian students in two Fulton County high schools

Salary Range	Negro Students		Caucasian Students	
	Number	Per Cent	Number	Per Cent
Above $22,000	0	0.00	1	2.86
20,000 - 19,000	0	0.00	1	2.86
17,000 - 19,000	0	0.00	2	5.71
14,000 - 16,000	0	0.00	10	28.57
11,000 - 13,000	0	0.00	13	37.14
8,000 - 10,000	0	0.00	7	20.00
5,000 - 7,000	5	14.28	1	2.86
2,000 - 4,000	30	85.72	0	0.00
Total	35	100.00	35	100.00
Mean	$ 3,342.00		$13,280.00	
Median	2,500.00		17,550.00	
Sigma	1,110.00		3,570.00	
S.E.M.	110.00		610.00	

Negro students

For the parent or parent person of Negro boys and girls the annual salary ranged from a low of $3,000 to a high of $5,750.00, with a mean of $3,342.00, a median of $2,500.00, a standard deviation of $1,110.00, and a standard error of the mean of $110.00. Fourteen and twenty-eight per cent of the parent salary was above the mean, 0.00 per cent of the annual salary was below the mean, and 86.72 per cent of the annual salary was within the mean class interval.

Caucasian students

For the parent or parent person of Caucasian boys and girls the annual salary ranged from a low of $5,000.00 to a high of $22,000.00, with a mean of $13,280.00, a median of $17,550.00, a standard deviation of $3,570.00, and a standard error of the mean of $610.00. Forty per cent scored above the mean, 22.86 per cent of the annual salary was below the mean, and 37.14 per cent was within the mean class interval.

The "t" Ratio of Comparative Data

Table 22 shows the comparative salary range for the father or father person of the two groups of students: the mean was $3,342.00 and $13,280.00 for Negro and Caucasian students, respectively, with a difference of $9,938.00 in favor of the Caucasian students. The median was $2,500.00

and $17,550.00 for the Negro and Caucasian students, respectively, with a difference of $15,050.00 in favor of the Caucasian students. The standard deviation was $1,110.00 and $3,570.00 for the Negro and Caucasian students, respectively, with a difference of $2,460.00 in favor of the Caucasian students. The standard error of the mean was $110.00 and $610.00 for the Negro and Caucasian students, respectively, with a difference of $500.00 in favor of the Caucasian students. The standard error of the difference between the two means was $3,738.00.

TABLE 22.--Comparative data of annual salary of father or father person of thirty-five Negro and thirty-five Caucasian students in two Fulton County high schools

Group	Mean	Sigma	$S.E._M$	$M_1 - M_2$	$M_1 S.E._{M_2}$	t
Caucasian	$13,280	$3,570	$610			
				$9,938	$ 639	15.55
Negro	$ 3,342	$1,110	$190			

The "t" for these data was 15.55, which was significant for it was greater than 2.58 at the (.01) per cent level of confidence with 68 degrees of freedom. Therefore, the difference in salary range of the father or father person of the two groups of students in the two Fulton County high schools represented in this study was significant.

TABLE 23.--Frequency of educational status of father or father person of thirty-five Negro and Caucasian students in two Fulton County high schools

Schooling by Grades	Caucasian Students	Negro Students	Total
Not completed elementary school		3	3
Completed elementary school 1 - 7	1	8	9
Completed less than four years of high school	0	22	22
Completed high school	16	2	18
High school plus business or trade school	2		2
Less than four years of college	3		3
College graduate	11		11
Study beyond college	2		2
Total	35	35	70

$X^2 = 20.60$

$D_f = 6$

Criterion $X^2 = 16.812$

Chi Square Ratio of Comparative Data

The X^2 for this data was 20.60. It was statistically significant because it was greater than its criterion value at the one per cent level of competence at 16.812. Therefore, the data does indicate the difference in the educational levels of the parent of the two groups was significant.

TABLE 24.--Occupational status of father or father person of thirty-five Negro and Caucasian students in two Fulton County high schools

Occupations	Caucasian Students	Negro Students	Total
Professional, technical and managerial occupations	11		11
Clerical and sales occupation	14		14
Service occupations	4	25	29
Processing occupations		4	4
Machine Trade occupations	2		2
Bench work occupations	1		1
Structural work occupations	3	1	4
Miscellaneous occupations		5	5
Total	35	35	70

$X^2 = 38.83$

$D_f = 7$

Criterion $X^2 = 18.475$

Chi Square Ratio of Comparative Data

The X^2 for this data was 38.83. It was statistically significant because it was greater than its criterion value at the one per cent level of competence at 18.475 with 7 degrees of freedom. Therefore, the data does indicate the difference in the salary level of father or father person of the two groups was significant.

CHAPTER III

SUMMARY, FINDINGS AND CONCLUSIONS

Recapitulation of the Theoretical Basis of the Study

Every since the historic 1954 Supreme Court edict on school desegregation, volumes of materials have been written on both sides of the question--some in favor of and some not in favor of the edict. The chief argument of those who oppose the edict has been that the vast difference in the learning capacity of the Negro and Caucasian students will result in a lowering of educational standards of all students. The facts, however, do not support this argument. This argument has some basis only when we ignore the reasons for this difference in performance on standardized test.

When we look at the reasons for this difference, one must, I believe, some to the conclusion as this writer has, that, proper education of all of America's children and re-evaluation of our educational system and its effectiveness in our society should be of major concern to all of us today.

The effect of social and economic conditions under which children are forced to live, and how they help to hinder the educational development of children is of great

concern to men of good will today throughout the country. Educators and social scientists alike agree that:

> The future of any country which is dependent on the will and wisdom of its citizens is damaged, and irreparably damaged, whenever any of its children are not educated to the fullest extent of its capacity, from grade school through graduate school.[1]

All the evidence, so far as researchers know it, show that what we call "racial" characteristics are certain visible physiological traits such as skin color and hair texture which have become somewhat specialized in certain parts of the world. All evidence so far as researchers know it show that in matters of intelligence, and feelings, in the development of wisdom, kindness, social attitudes, and other important matters, it is the social learning rather than inheritance, which determines what happens, and the capacity for these are distributed among all groups.

Recapitulation of the Research and Design

The major purpose of this research was to appraise the algebra achievement of the selected groups of high school students and analyze this achievement comparatively in light of differing backgrounds, social and economic.

More specifically, the purposes were characterized by the following objectives:

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[1]U.S. Department of Health, Education and Welfare, op. cit., p. 2.

1. To determine the level of achievement attained by the two selected groups of high school students in Fulton County.

2. To determine the significant difference, if any, in Algebra of these two groups.

3. To investigate the factors to which these differences, if any, may be attributed.

   a. What is the difference in socio-economic backgrounds of the two groups of selected students.

   b. What is the difference in education and training of the parent, if any, of the two groups of selected students.

4. To recommend methods by which these differences, if any, may be eliminated.

The casual-comparative method of research employing the specific technique of testing and statistical analysis, was used to gather the necessary data for this study. The specific statistic used was the mean, median, standard deviation, standard error of difference between the mean, Fisher's "t" and chi square.

The subjects in this study were students enrolled in second year Algebra assigned to the writer at Briarwood High School and the students enrolled in second year Algebra assigned to the chairman of the department of mathematics at Eva L. Thomas High School. The instruments used to gather data for this study were as follows:

1. Blyth Second-Year Algebra Test, Revised Edition, (Eval. and Adj. Series, 1966) Form E. Iowa University Testing Service.

2. Questionnaire of education and occupation of parent or students involved in the study.

3. California Test of Mental Maturity, Short Form (Revised Edition 1963).

4. Official school records.

The following definitions of terms are given for the purpose of understanding in this research:

1. "Socio-economic" - As used in this study is defined as the position a person occupies on a continuum with reference to the range of salary and education of father or father person.

2. "Achievement" - Refers to the Algebra achievement as measured by the Blyth Second Year Algebra Test (Revised Edition, 1966), Form E.

3. "Intelligence" - Refers to the ability to learn acts, or perform acts that are functionally useful as measured by the California Test of Mental Maturity, Short Form (Revised Edition, 1963).[1]

Summary of Related Literature

A large volume of literature on the differences in achievement between Negro and Caucasian students has been produced during the past few decades. Most of this literature deals with differences in general rather than differences in specific areas.

According to an article in the Journal of Abnormal and Social Psychology, (March, 1966). The evidence is now overwhelming that high intellectual potentials exist in a larger percentage of individuals from lower income and social status groups than was previously thought.

Dovan found out that deprived students perform to a

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[1]Sullivan, Clark, and Tieges, op. cit.

greater degree on examinations when a reward is offered, than when there is no reward offered, but students from middle class homes performed close to their maximum levels while rewards are absent. It would seem then that motivation is important if students are to do well. Motivation is that which gives both direction and intensity to human behaviors, so states Jack R. Frymer in a recent article in the N.E.A. Journal.[1] It has been found that students from more favorable socio-economic situations are on the average more motivated academically than those who come from less disadvantaged circumstances.

Researchers agree that there is a greater difference of background in the area of language; therefore, there is increasing recognition that I.Q. scores of underprivileged children do not reflect their true ability, because the test include words that are not in the experience repertoir of these children.

Marked differences exist in ways of living to which children are accustomed. Both the method and the materials employed in the school are likely to conform to the upper social classes placing children who do not have this background at a disadvantage. Henry Maas says that the schools must study its community systematically if it is to meet the varying needs of its pupils.

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[1] National Education Association Journal, op. cit., (February, 1968).

Joseph Peterson and Lyle H. Lanier, psychologists, became aware of the importance of comparing Negro and whites not only in situations in which their respective environments were very different, but also in situations where their environments were very approximately the same. The results were that, where there was a difference in their situations the whites performed on a higher level than the Negroes, but in situations where their situations were approximately the same there was no significant difference between the two social groups.

It is often difficult when we attempt to compare races, because there are many things that stand in the way. It is a subject in which first impressions not based on scientific study are very likely to be far from the mark. There are race prejudices standing in the way of a fair view of the facts. Facts, themselves, are often misleading.

Materials available to us at the present time do not justify the conclusion that inherited genetic differences are a major factor in producing the differences between the achievements of different people or groups.

Summary of Findings

Organization.--The summary of the basic findings of this research as reported under the test captions of the immediate, separate paragraphs to follow, are also depicted in the Summary Table 25, page 68.

California Test of Mental Maturity
Table 1 and 2

On the California Test of Mental Maturity, the following statistical measures were obtained: for the group of Negro students, a mean of 97.85, a median of 98.87, with a standard deviation of 10.05, and for the Caucasian students a mean of 110.16, a median of 110.95, and a standard deviation of 10.50, with a standard deviation of the difference between the means of 2.5 and a "t" of 4.9.

California Test of Mental Maturity
Negro girls and Caucasian girls
Table 3 and 4

On the California Test of Mental Maturity, the following statistical measures were obtained: for the Negro girls, a mean of 98.97, a median of 99.5, with a standard deviation of 5.7; and for the Caucasian girls, a mean of 103.87, a median of 103.00, with a standard deviation of 9.99, with a standard deviation of the difference between the means of 2.83 and a "t" of 1.8.

California Test of Mental Maturity
Negro boys and Caucasian boys
Table 5 and 6

On the California Test of Mental Maturity, the following statistical measures were obtained: for the Negro boys a mean of 91.4, a median of 98.0 with a standard deviation of 7.38; and for the Caucasian boys, a mean of 110.70, a median of 109.50, with a standard deviation of 11.30, with a standard deviation of the difference between the means of 3.37 and a "t" of 2.76.

The Blyth Second Year Algebra Test
Table 7 and 8

On the Blyth Second Year Algebra Test, the following statistical measures were obtained: for the Negro students, a mean of 19.71, a median of 18.30, with a standard deviation of 7.30; and for the Caucasian students, a mean of 21.57, a median of 20.17, and a standard deviation of 6.69, with a standard deviation of the difference between the means of 1.68 and a "t" of 1.09.

The Blyth Second Year Algebra Test
Computation, Table 9 and 10

On the Blyth Second Year Algebra Test for the component of Algebra Computation, the following statistical measures were obtained: for the group of Negro students, a mean of 6.8, a median of 7.5, a standard deviation of 3.81; and for the Caucasian students, a mean of 7.56, a median of 7.30, and a standard deviation of 2.76, with a standard deviation of the difference between the mean of .25 and a "t" of 2.92.

The Blyth Second Year Algebra Test
Problem Solving, Table 17 and 18

On the Blyth Second Year Algebra Test for the component of Algebra Problem Solving, the following statistical measures were obtained: for the group of Negro students, a mean of 12.77, a median of 11.62, with a standard deviation of 5.76; and for the Caucasian students, a mean of 13.37, a median of 12.37, with a standard deviation of 1.25, with a standard deviation of the difference between the means of 1.01 and a "t" of .593.

The Blyth Second Year Algebra Test
Computation, Table 11 and 12

On the Blyth Second Year Algebra Test for the component of Algebra Computation, the following statistical measures were obtained: for the Negro girls, a mean of 7.85, a median of 6.50, a standard deviation of 3.33; for the Caucasian girls, a mean of 6.67 a median of 6.30, a standard deviation of 7.98, with a standard deviation of the difference between the means of 2.13 and a "t" of .51.

The Blyth Second Year Algebra Test
Problem Solving, Table 15 and 16

On the Blyth Second Year Algebra Test for the component of Algebra Problem Solving, the following statistical measures were obtained: for the group of Negro girls, a mean of 12.50, a median of 10.5, a standard deviation of 6.48; and for the Caucasian students, a mean of 12.64, a median of 13.00, a standard deviation of 5.22, with a standard deviation of the difference between the means of 1.95 and a "t" of .07.

The Blyth Second Year Algebra Test Computation, Table 13 and 14

On the Blyth Second Year Algebra Test for the component of Algebra Computation, the following statistical measures were obtained: for the Negro boys, a mean of 7.00, a median of 8.00, a standard deviation of 4.17; and for the Caucasian boys a mean of 8.50, a median of 8.50, a standard deviation of 2.70, with a standard deviation of the difference between the means of 2.28 and a "t" of .10.

The Blyth Second Year Algebra Test Problem Solving, Table 19 and 20

On the Blyth Second Year Algebra Test for the component of Algebra Problem Solving, the following statistical measures were obtained: for the Negro boys, a mean of 12.60, a median of 12.70, a standard deviation of 7.70; and for the Caucasian boys a mean of 13.83, a median of 12.30, a standard deviation of 4.56, with a standard deviation of the difference between the means of 2.23 and a "t" of 2.31.

Status of salary of father or father person, Table 21 and 22

On the annual salary range of the father or father person, the following statistical measures were obtained: for the Negro students a mean salary of $3,342, a median salary of $2,500, a standard deviation of $1,110; and for the Caucasian students, a mean salary of $13,280, a median of $17,550, a standard deviation of the difference between the mean of $3,570, with a standard deviation of the difference between the means of $3,738 and a "t" of 2.68.

Status of the educational level of father or father person, Table 23

On the educational level of father or father person, the following statistical measures were obtained: a chi square of 20.60, degrees of freedom of 6, and a criterion of 16.812 at the one per cent level of competence.

Status of occupation of father or father person, Table 24

On the occupation of father or father person, the following statistical measures were obtained: a chi square

SUMMARY TABLE 25.--Data derived from the results on the Califfornia Test of Mental Maturity and the Blyth Second Year Algebra Test by thirty-five Negro students and thirty-five Caucasian students of the Eva L. Thomas High School and Briarwood High School, Fulton County, Georgia

Component	Negro Students			Caucasian Students			Comparative Data		
	Mean	S.D.	S.E.	Mean	S.D.	$S.E._{M_1}$	Diff. of Mean	$M_1 S.E. M_2$	"t"
Intelligence Quotient	97.85	10.05	1.75	110.16	10.50	1.80	12.31	2.50	4.90
Girls	98.75	5.95	1.36	103.87	9.99	2.49	5.12	2.83	1.80
Boys	91.40	7.38	1.95	110.70	11.30	2.74	9.30	3.37	2.76
Algebra Achievement	19.71	7.30	1.25	21.57	6.69	1.13	1.86	1.68	1.09
Algebra Computation	6.80	3.81	.653	7.57	2.76	.413	.73	.861	.08
Algebra Problem Solving	12.77	5.76	.987	13.37	1.25	.214	.60	1.01	.593
Algebra Computation Concepts Girls	7.85	3.33	.765	6.76	7.98	1.99	1.09	2.13	.51
Algebra Problem Solving Concepts Girls	12.50	6.48	1.46	12.64	5.22	1.30	.14	1.95	.07
Algebra Computation Concepts Boys	7.00	4.17	1.11	8.50	2.70	.665	1.50	1.28	1.17
Algebra Problem Solving Concepts Boys	12.60	7.70	2.07	13.83	4.56	1.10	1.23	2.23	.53

of 38.83, degrees of freedom of 7, and a criterion of 18.475 at the one per cent level of competence.

Conclusions

The findings of this study seem to warrant the following conclusions:

1. The data seem to warrant the conclusion that the group of Negro and Caucasian students were experiencing a significant difference in mental development as measured by the California Test of Mental Maturity.

2. The data seem to warrant the conclusion that the group of Negro girls were experiencing a slightly greater mental development than the Negro boys. As measured by the California Test of Mental Maturity.

3. The data seem to warrant the conclusion that the groups of Negro girls and the Caucasian girls were experiencing a slight difference in mental development, but this difference was not significant, while the difference between Negro boys and Caucasian was significant.

4. The data seem to warrant the conclusion that the groups of Negro and Caucasian students were experiencing a level of Algebra achievement that was on about the same level. The difference was not significant.

5. The data seem to warrant the conclusion that the groups of Negro girls and Caucasian girls, that the Negro girls were achieving higher than the Caucasian girls on Algebra Computation, and that the two groups were achieving on about the same level for problem solving.

6. The data seem to warrant the conclusion that the Caucasian boys were achieving higher than Negro boys in both Algebra computation and problem solving, while the Caucasian boys and Negro girls were achieving on about the same level in Algebra computation, and the Caucasian boys were achieving only slightly higher than the Negro girls in Algebra problem solving.

7. The data seem to warrant the conclusion that the annual salary range and occupational expectancy was greater for the Caucasian students than for the Negro students.

Implications

The implications for educational theory and practice that grew out of this study are given below:

1. It would appear that the level of intelligence quotient as measured by standardized intelligence test are not a good indicator of the chances of success in subject areas.

2. It would appear that there is something other than native ability that account for the fact that some groups achieve higher than others on test of the intelligence variety.

3. It would appear from the data that the educational program of a school or school system should provide the fullest opportunity for the individual learner considering each individual's difference in order that each may experience successful performance to his fullest potential.

4. It would appear from the data that in order for children from the lower socio-economic backgrounds to do well on test of the I.Q. sort that they will have to acquire experiences that are at the present outside of their particular environment.

5. It would appear from the data that positive motivation is a greater indicator of achievement on test than native ability. It would appear further that Negro girls and Caucasian boys are more positively motivated than are Negro boys and Caucasian girls.

6. It would appear from the data that a positive relationship exist between the educational level of parent and the annual income of parent.

Recommendations

The findings of this research would appear to justify

the following recommendations:

1. That the Fulton County School System give serious thought to the reasons why there are groups of students that do not perform as highly on test as other groups, and that the system undertake programs designed to positively motivate students that are not performing at their maximum potential.

2. That the Fulton County School System undertake to provide students from the lower socio-economic community the opportunity to gain experiences that are not found in their community by increasing the scope of its present school integration program.

3. That the Fulton County School System undertake, or rather, implement programs to assure that Negro students presently attending integrated schools would be able to become a part of the total school program. That the present practice of separate bussing of students living on the same bus route or bus routes in close proximity be discontinued.

4. That the Fulton County School System give more close consideration to the selection of school sites in future school construction programs, so that funds that may go into the construction of physical plants may later be abandoned and may go into the improvement of course offering, particularly in communities where community needs may warrant special course offerings.

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A P P E N D I X

1963 S-FORM LEVEL 4

CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

INSTRUCTIONS TO EXAMINEES:

In taking this test you will show how well you think and what you do when you face new problems. No one is expected to do the whole test correctly, but you should answer as many items as you can. Work as fast as you can without making mistakes.

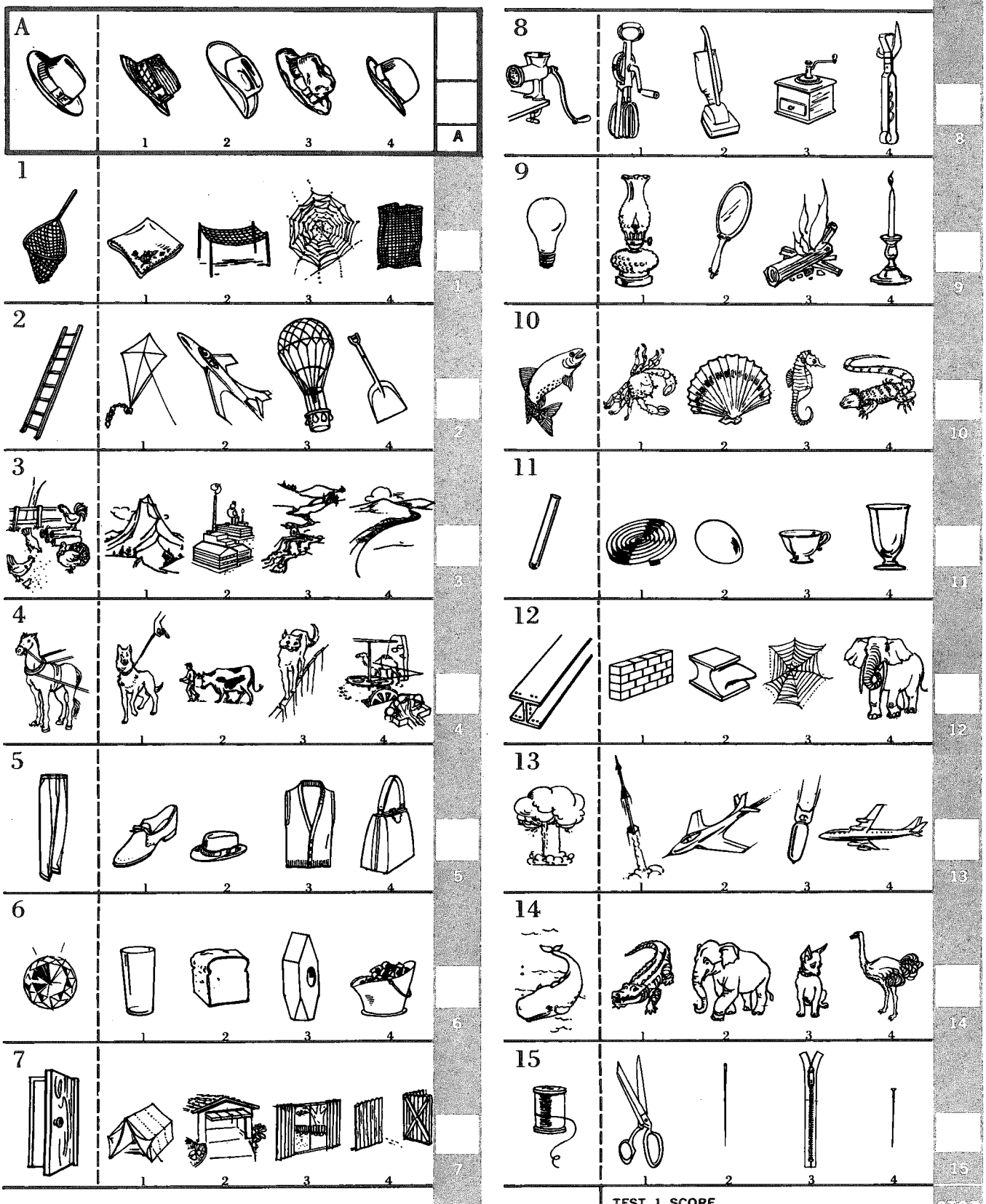
Do not write or mark on this test booklet unless told to do so by the examiner.

PUBLISHED BY CALIFORNIA TEST BUREAU

3RD PRINTING

TEST 1

DIRECTIONS: In each row there is one picture that shows something which is the opposite of the first picture. Find it and mark its number.

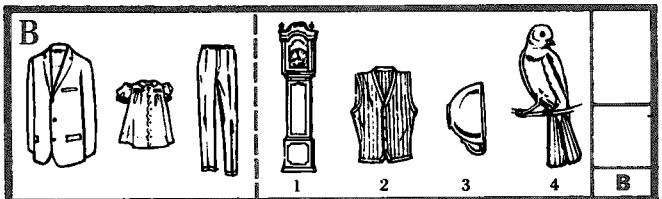


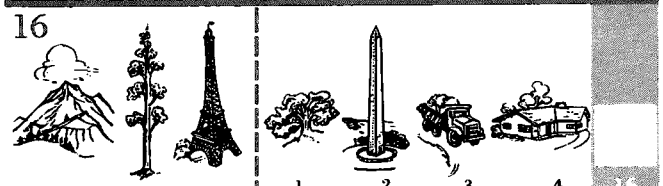
TEST 1 SCORE
(number right) .....

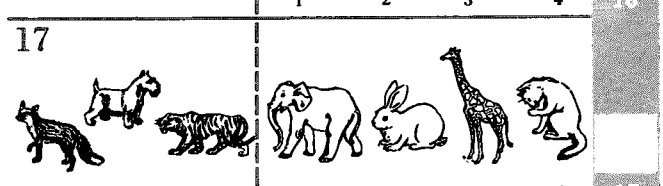
STOP

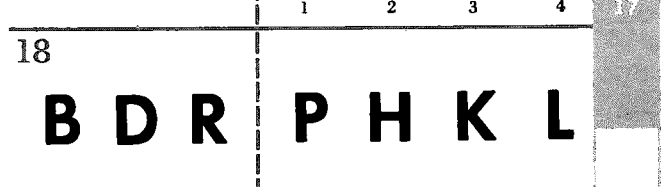
TEST 2

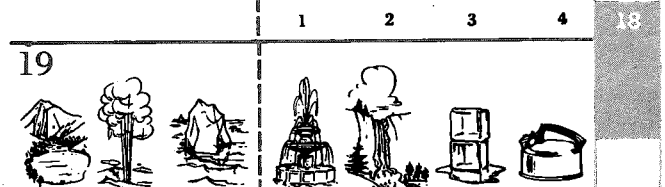
DIRECTIONS: The first three pictures in each row are of things which are alike in some way. Decide how they are alike and then find the picture to the right of the dotted line that is most like them and mark its number.

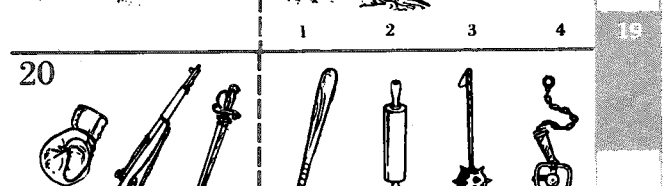
B 

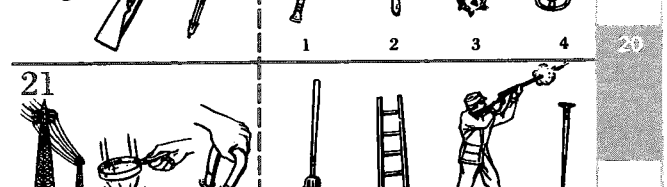
16 

17 

18 

19 

20 

21 

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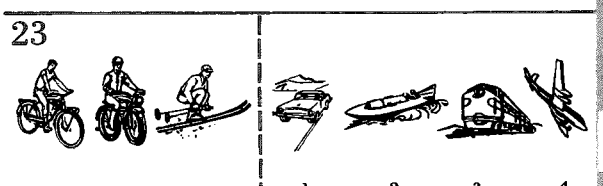
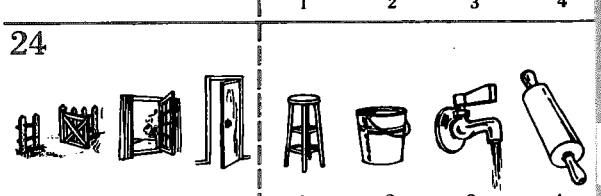
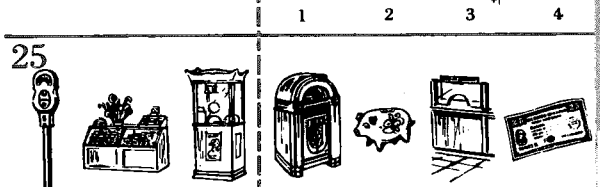
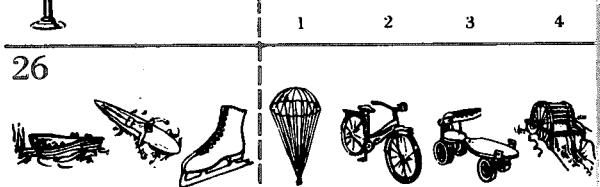
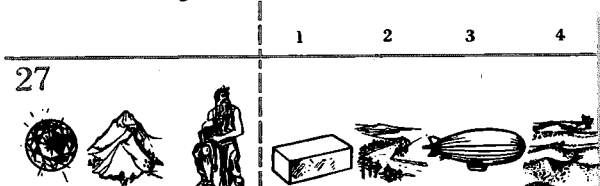
23 

24 

25 

26 

27 

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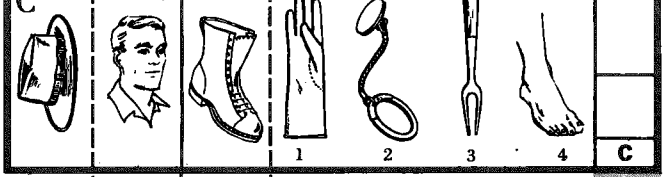
TEST 2 SCORE
(number right).....

STOP

TEST 3

DIRECTIONS: In each row, the first picture is related to the second. The third picture goes with one of the four pictures to the right of the second dotted line in the same way. Find the related picture and mark its number.

C



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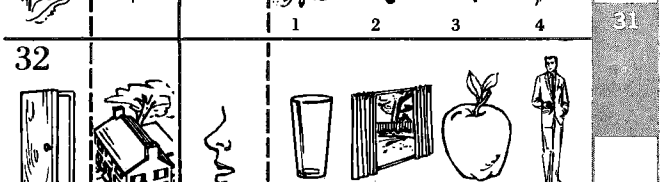

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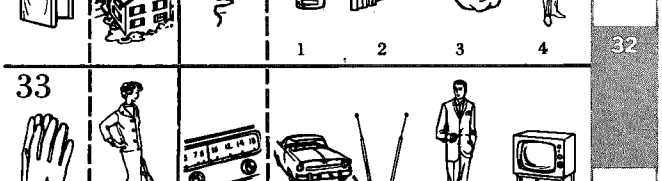

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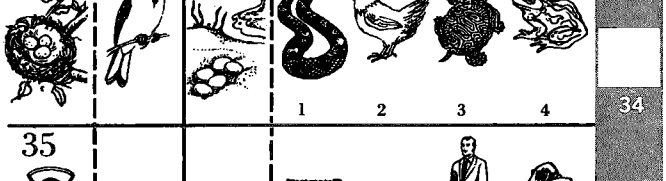

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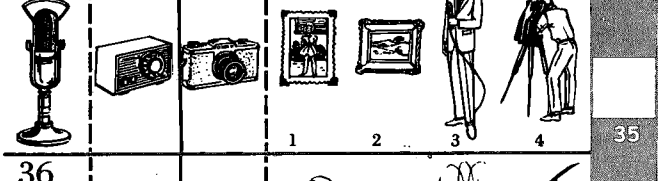

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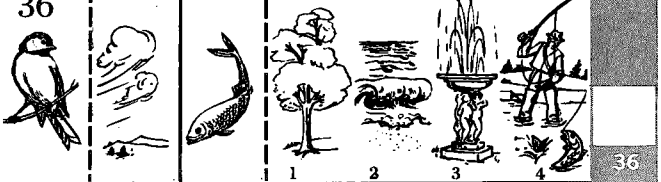

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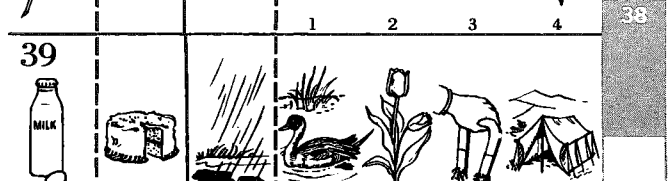

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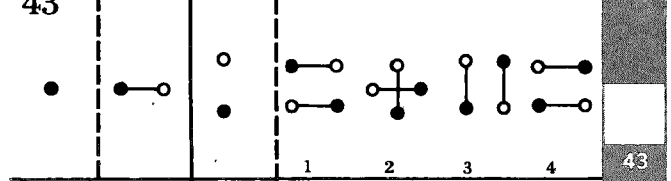

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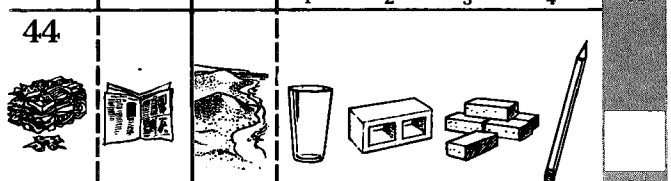

TEST 3 SCORE
(number right) . . . . . STOP

TEST 4

DIRECTIONS: Each problem tells you that a certain number of coins will add up to a certain amount of money. You are to find the correct number of coins of each kind—cents, nickels, dimes, quarters, and half-dollars. Four possible answers are found beneath each problem. These refer to combinations of coins at the bottom of this page from which to select the correct answer. Work the problem mentally and find the letter of the answer you get among those at the bottom of the page.

D. 6 coins—10 cents
a b c d

(46.) 3 coins—25 cents
m n o p

(47.) 7 coins—15 cents
b c d e

(48.) 5 coins—91 cents
r s t u

(49.) 4 coins—26 cents
t u v w

(50.) 4 coins—41 cents
t u v w

(51.) 6 coins—15 cents
a b c d

(52.) 3 coins—80 cents
m n o p

(53.) 4 coins—16 cents
s t u v

(54.) 4 coins—90 cents
q r s t

(55.) 5 coins—47 cents
i j k l

(56.) 5 coins—82 cents
i j k l

(57.) 7 coins—48 cents
e f g h

(58.) 5 coins—46 cents
q r s t

(59.) 7 coins—63 cents
e f g h

(60.) 7 coins—93 cents
e f g h

ANSWERS

	Cents	Nickels	Dimes	Quarters	Half-Dollars
a	5	—	—	—	—
b	5	2	—	—	—
c	5	—	1	—	—
d	5	1	—	—	—
e	3	2	1	1	—
f	3	1	2	1	1
g	3	1	1	1	1
h	3	2	—	2	—
i	2	2	2	—	—
j	2	1	1	—	1
k	2	—	2	1	—
l	2	1	—	1	1
m	—	2	1	—	—
n	—	1	—	1	1
o	—	1	2	—	—
p	—	1	—	2	1
q	—	1	1	1	1
r	1	2	1	1	—
s	1	1	1	1	1
t	1	1	2	—	—
u	1	2	1	—	—
v	1	3	—	—	—
w	1	1	1	1	—

TEST 4 SCORE (number right)..... STOP

TEST 5

DIRECTIONS: Work these problems. Use scratch paper if necessary. Mark the letter of each correct answer.

E. If you earned \$5.00 and spent \$3.00, how many dollars would you have left?

[a] **\$1.00** [c] **\$3.00**
[b] **\$2.00** [d] **\$4.00**

61. What number, if multiplied by 3, is equal to 2 times 9?

[a] **3** [c] **9**
[b] **6** [d] **18**

62. How much will your mother have to pay for the cleaning of a rug 9 feet wide and 12 feet long at the rate of 20¢ a square foot?

[a] **\$1.08** [c] **\$8.40**
[b] **\$4.20** [d] **\$21.60**

63. If a telephone book of 65 pages contains 4550 names, with the same number of names on each page, how many names are on the first 9 pages?

[a] **505** [c] **630**
[b] **585** [d] **700**

64. Richard saw an air rifle advertised for \$21.00 at one-third off for cash. How much money will he need to buy it?

[a] **\$18.00** [c] **\$9.00**
[b] **\$14.00** [d] **\$7.00**

65. An airplane is capable of carrying 30,000 pounds. Eighty passengers, whose average weight is 160 pounds, board the plane and each has 44 pounds of luggage. If 3680 pounds of air freight are loaded besides, how many 50-pound sacks of mail can also be placed on the plane?

[a] **200** [c] **326**
[b] **256** [d] **600**

66. A swimming pool is 60 feet long and 30 feet wide. The water in the pool is 4 feet deep on the average. How long will it take to fill the pool if the water runs in at the rate of 90 cubic feet a minute?

[a] **5 min.** [c] **45 min.**
[b] **26 min.** [d] **80 min.**

67. A clock on the tower of a building has a dial 7 feet in diameter. If marks representing the hours are placed on the edge of the dial, how far apart will the centers of these marks be? (Circumference of a circle is about $3\frac{1}{7}$ times the diameter.)

[a] **22 in.** [c] **8 in.**
[b] **14 in.** [d] **7 in.**

68. A portion of the bleachers on an athletic field consists of 20 rows of seats, each of which is 50 feet long. There are also 10 rows of seats, each 30 feet long. If each spectator is allowed 30 inches of seating space, how many can be seated when the bleachers are full?

[a] **280** [c] **400**
[b] **312** [d] **520**

69. In a field meet, 20 events were listed for the day. Pupils from your school won 60 per cent of the events. How many events did you lose?

[a] **4** [c] **8**
[b] **3** [d] **12**

70. How many $1\frac{1}{2}$¢ stamps would you give in even exchange for thirty $\frac{1}{2}$¢ stamps?

[a] **10** [c] **20**
[b] **15** [d] **45**

TEST 5 SCORE (number right) .....

TEST 6

DIRECTIONS: Mark the number of the word that means the same or about the same as the first word.

F. **blossom** [1] tree [2] vine [3] flower [4] garden

71. **conceal** [1] pitch [2] hide [3] color [4] corner

72. **tone** [1] wild [2] book [3] reveal [4] pitch

73. **organic** [1] musical [2] pompous [3] living [4] smooth

74. **nauseate** [1] envy [2] sicken [3] drowse [4] modify

75. **eclipse** [1] obscure [2] deny [3] forget [4] regret

76. **literate** [1] wasted [2] decayed [3] discarded [4] educated

77. **idealist** [1] visionary [2] fault [3] gatherer [4] farmer

78. **rampant** [1] sliding [2] terrified [3] swaying [4] raging

79. **jeopardy** [1] indemnity [2] loss [3] danger [4] incarceration

80. **knead** [1] refuse [2] mix [3] want [4] define

81. **valor** [1] haste [2] contentment [3] traverse [4] courage

82. **predictor** [1] prophet [2] pull [3] predatory [4] prime

83. **expose** [1] relate [2] construct [3] disclose [4] decant

84. **winsome** [1] chary [2] charming [3] critical [4] valid

85. **tumult** [1] illness [2] infamy [3] commotion [4] gait

86. **vulnerable** [1] brave [2] expensive [3] defenseless [4] guilty

87. **vanity** [1] egotism [2] sorrow [3] disgust [4] dislike

88. **obtrusive** [1] meddlesome [2] stupid [3] unintelligible [4] unclean

89. **adjunct** [1] victory [2] compression [3] accessory [4] debt

90. **rancor** [1] malice [2] capacity [3] regard [4] position

91. **colloquial** [1] subordinate [2] literary [3] grammatical [4] conversational

92. **hauteur** [1] humility [2] arrogance [3] suavity [4] obstacle

93. **profound** [1] nice [2] find [3] ridiculous [4] deep

94. **venal** [1] palatal [2] corrupt [3] visible [4] feudal

95. **tacit** [1] implied [2] permissible [3] defeated [4] vociferous

TEST 6 SCORE (number right) .....

DIRECTIONS: Read the following items. Mark the number or letter of each correct answer according to the story.

G. The story read to you a while ago concerned people who
- [1] **lived on an island.**
- [2] **lived on a peninsula.**
- [3] **never achieved a high civilization.**
- [4] **eventually brought about the Ming Dynasty.**

96. On the Aegean Islands, one can see and photograph ruined palaces, and admire ancient
- [1] **statuary.**
- [2] **ships.**
- [3] **volcanoes.**
- [4] **myths.**

97. The center of the Aegean civilization was located at a point where
- [1] **it was easy to make war on the mainland.**
- [2] **it was easy to conquer three continents.**
- [3] **Europe, Africa, and Asia joined.**
- [4] **Europe, Africa, and Asia are closest together.**

98. In the summer, the Cretan men wore
- [1] **togas.**
- [2] **long robes.**
- [3] **modern-appearing clothes.**
- [4] **loincloths.**

99. The Cretans averaged
- [1] **nearly six feet in height.**
- [2] **a few inches under five feet in height.**
- [3] **a few inches over five feet in height.**
- [4] **a few inches over six feet in height.**

100. The Cretan women were light-complexioned and apparently
- [1] **were of a different ethnic group than the men.**
- [2] **did little housework.**
- [3] **spent considerable time indoors.**
- [4] **helped the men with their work.**

101. The clothing of the Cretan women
- [1] **was rather primitive.**
- [2] **was quite modern.**
- [3] **lacked lace and embroidery.**
- [4] **was usually a simple toga.**

102. Two metals the Cretans especially needed were
- [1] **iron and steel.**
- [2] **tin and copper.**
- [3] **lead and zinc.**
- [4] **copper and steel.**

103. The Cretans first developed
- [1] **great fleets of warships.**
- [2] **great land armies.**
- [3] **great fleets of merchant vessels.**
- [4] **pirate fleets.**

104. The Cretan fleet ruled out the need for
- [1] **a large land army.**
- [2] **ships with sails and oars.**
- [3] **land defenses.**
- [4] **peaceful trade with other areas.**

ON TO T NEXT PA

105. The Cretans finally developed the

[1] **galley.**
[2] **merchant vessel.**
[3] **warship.**
[4] **packet ship.**

106. The greatest wealth the Cretans ever possessed was

[1] **gold and ivory from North Africa.**
[2] **amber and jade from Asia.**
[3] **their great fleet of warships.**
[4] **the skill of their craftsmen and designers.**

107. The Cretans lived in comfortable homes while Europe was still

[1] **unsettled.**
[2] **the center of civilization and culture.**
[3] **in a primitive state.**
[4] **a completely unknown area.**

108. The Cretan palaces were provided with

[1] **central heat.**
[2] **running water.**
[3] **Persian carpets.**
[4] **brick floors.**

109. The largest Cretan buildings were usually constructed of either

[1] **limestone or gypsum.**
[2] **marble or sandstone.**
[3] **granite or concrete.**
[4] **wood or gypsum.**

110. The Cretan ships brought home gold, amber, ivory, and

[1] **jewels from the Orient.**
[2] **slaves from Africa.**
[3] **perfumes from Levant.**
[4] **samples of fine craftsmanship.**

111. As their civilization developed and the fleet became greater, the knowledge and skills of the Cretan craftsmen

[1] **decreased.**
[2] **remained the same.**
[3] **increased.**
[4] **centered around building warships.**

112. We know of the expansion of the Aegean civilization from

[1] **Asiatic writers.**
[2] **records left by the Egyptians.**
[3] **legends of the Arabic peoples.**
[4] **cities like Mycenae and Argos.**

113. The early mainland cities, following Cretan expansion, contained palaces like those at

[1] **Knossos.**
[2] **Alexandria.**
[3] **Rome.**
[4] **Cyprus.**

114. The early mainland palaces were decorated in the

[1] **Cretan style.**
[2] **Greek style.**
[3] **Egyptian style.**
[4] **European style.**

GO ON TO THE NEXT PAGE

115. One thing which identified the Cretan homes as being reasonably modern was

[1] **central heat.**
[2] **hot and cold running water.**
[3] **windows.**
[4] **an evaporative cooling system.**

116. The Aegean civilization came to an end following

[1] **two successive invasions.**
[2] **three successive invasions.**
[3] **four successive invasions.**
[4] **five successive invasions.**

117. The first invaders of the Aegean area were the

[1] **Persians.**
[2] **Egyptians.**
[3] **Romans.**
[4] **Achaeans.**

118. The Aegean civilization ended in approximately

[a] **900 B.C.**
[b] **1100 B.C.**
[c] **1500 B.C.**
[d] **1800 B.C.**

119. The last invaders of the Aegean area were the

[1] **Huns.**
[2] **Spartans.**
[3] **Dorians.**
[4] **Turks.**

120. For many people today, the Aegean islands are merely

[1] **barren lands.**
[2] **dots on a map.**
[3] **tourist curiosities.**
[4] **uninteresting.**

TEST 7 SCORE
(number right).....

STOP

CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

1963 S-FORM / LEVEL 4

DEVISED BY WILLIS W. CLARK AND ERNEST W. TIEGS

Name ..... (Last / First / Middle)

School or Organization ..... City .....

Grade or Occupation ..... Examiner .....

M F (Circle one)

Date of Test ..... (Year / Month / Day)

Date of Birth ..... (Year / Month / Day)

C.A. ..... ( ) (Years / Months / Total Mos.)

TEST / FACTOR	1. OPPOSITES	2. SIMILARITIES	3. ANALOGIES	I. LOGICAL REASONING	4. NUMERICAL VALUES	5. NUMBER PROBLEMS	II. NUMERICAL REASONING	III. VERBAL CONCEPTS (6. VERBAL COMPREHENSION)	IV. MEMORY (7. DELAYED RECALL)	LANGUAGE (Tests 5, 6, 7)	NON-LANGUAGE (Tests, 1, 2, 3, 4)	TOTAL	I.S.I.†	LANGUAGE	NON-LANGUAGE	TOTAL
POSSIBLE SCORE	15	15	15	45	15	10	25	25	25	60	60	120				
RAW SCORE													ACTUAL G.P.			
PERCENTILE*													GRADE C.A.			
														M.A.‡		
														RAW SCORE		
														I.Q.‡		

STANDARD SCORE: 73, 70, 66, 65, 60, 55, 50, 45, 40, 35, 34, 30, 27

PERCENTILE: 99, 98, 95, 84, 70, 60, 50, 40, 30, 16, 5, 2, 1

STANINE: 9, 8, 7, 6, 5, 4, 3, 2, 1

INTELLIGENCE QUOTIENT: 137+, 132, 126, 120, 116, 112, 108, 104, 100, 96, 92, 88, 84, 80, 74, 68, 63–

*Unless otherwise indicated, national norms appropriate for examinee's chronological age are used.

†Intellectual Status Index; see Manual.

‡Must be obtained from table in Manual.

Blyth Second-Year Algebra Test

Revised Edition · Form E

BY M. ISOBEL BLYTH MICHIGAN STATE UNIVERSITY

A TEST IN THE Evaluation and Adjustment Series

GENERAL EDITOR WALTER N. DUROST DEPARTMENT OF EDUCATION, UNIVERSITY OF NEW HAMPSHIRE

Directions to Students

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

In this test, each question has four suggested answers. Read each question carefully, and decide which of the answers is best. Then put a cross [×] through the letter in front of the answer you have chosen. You may mark the answer that seems correct even if you are not perfectly sure, but you should not make wild guesses. If you cannot decide on the correct answer, put a cross through [DK] for "Don't Know."

Do not mark more than one answer for any question and erase completely any mark you wish to change. You may do any necessary figuring on this test booklet.

Study the sample questions below and notice how the correct answers have been marked.

SAMPLE A

If $r = 4$, then r^3 equals

[**a**] 2
[**b**] 12
[**×**] 64
[**d**] 256
[DK]

SAMPLE B

The statement $n + 3n = 12$ is true if n equals

[**e**] 12
[**f**] 6
[**g**] 4
[**×**] 3
[DK]

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BLYTH SECOND-YEAR ALGEBRA TEST—FORM E

1 If $x = 2$ and $y = 5$, which of the following is true?

[**a**] $x + y > 8$

[**b**] $x + y < 8$

[**c**] $x + y \neq 7$

[**d**] $x + y = 3$

[DK]

2 The expression $(3a - 7b)^2$ equals

[**e**] $9a^2 - 42ab + 49b^2$

[**f**] $9a^2 - 42ab - 49b^2$

[**g**] $9a^2 - 49b^2$

[**h**] $9a^2 - 21ab + 49b^2$

[DK]

3 The three children in the Brown family were born in consecutive years. The sum of their ages is now 24 years. Which of the following equations expresses the above?

[**a**] $n + (n + 1) = n + 2$

[**b**] $n + (n + 2) + (n + 4) = 24$

[**c**] $n(n + 1)(n + 2) = 24$

[**d**] $n + (n + 1) + (n + 2) = 24$

[DK]

4 "Twice the sum of the numbers x and y added to three times their product" would be written as

[**e**] $2xy + 3(x + y)$

[**f**] $2(x + y) + 3xy$

[**g**] $5x + 5y$

[**h**] $2x + y + 3xy$

[DK]

5 The symbol $\{1, 2, 3\}$ represents

[**a**] an infinite set

[**b**] a finite set

[**c**] a cardinal number

[**d**] the number three

[DK]

6 The product of 4^6 times 4^{-2} equals

[**e**] 4^{-8}

[**f**] 4^{-4}

[**g**] 4^4

[**h**] 16^4

[DK]

7 The expression $(27a^3b^9)^{\frac{1}{3}}$ equals

[**a**] $3ab^3$

[**b**] $9ab^3$

[**c**] $9ab^6$

[**d**] $3a^9b^{27}$

[DK]

8 The value of $|-3|$ is

[**e**] less than -3

[**f**] -3

[**g**] 0

[**h**] 3

[DK]

9 If John can shovel the snow from a drive in 20 minutes and Bob can shovel it in 30 minutes, how long will it take them working together?

[**a**] 6 minutes

[**b**] 10 minutes

[**c**] 12 minutes

[**d**] 50 minutes

[DK]

10 Three times a positive real number is less than 3. The solution set is

[**e**] $\{1\}$

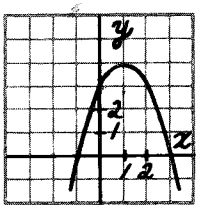
[**f**] $\{3\}$

[**g**] $\{1, 2, 3\}$

[**h**] $\{x$ such that $0 < x < 1\}$

[DK]

11 The graph of the relation $y = 3 + 2x - x^2$ is shown below. Which one of the following statements about the graph is *not* true?



[**a**] The x-intercepts are -1 and $+3$.

[**b**] The point (1, 4) is called a maximum point.

[**c**] The curve is called a hyperbola.

[**d**] The y-intercept is $+3$.

[DK]

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12 The expression $\frac{3}{\sqrt{2}+\sqrt{5}}$ may be written with a rational denominator by multiplying

[**e**] both numerator and denominator by $\sqrt{10}$

[**f**] only the denominator by $\sqrt{2}-\sqrt{5}$

[**g**] both numerator and denominator by the expression $\sqrt{2}+\sqrt{5}$

[**h**] both numerator and denominator by the expression $\sqrt{2}-\sqrt{5}$

[DK]

13 At a constant temperature the volume of a gas is inversely proportional to the pressure. If the pressure is multiplied by 3 while the temperature is unchanged, then the volume is

[**a**] decreased by 3

[**b**] divided by 3

[**c**] increased by 3

[**d**] multiplied by 3

[DK]

14 Which of the following is an arithmetic progression?

[**e**] 4, 7, 10, 13, . . .

[**f**] 4, 7, 8, 11, . . .

[**g**] 4, 8, 16, 32, . . .

[**h**] 4, 5, 7, 10, . . .

[DK]

15 What is the resulting equation when the value of x in the linear equation below is substituted in the quadratic equation below?

$$x^2 + 2y^2 = 10$$
$$x + y = 3$$

[**a**] $3 - y + 2y^2 = 10$

[**b**] $(3 + y)^2 + 2y^2 = 10$

[**c**] $(3 - y)^2 + 2y^2 = 10$

[**d**] $(3 - y + 2y)^2 = 10$

[DK]

16 One factor of $12x^2 + 7x - 10$ is

[**e**] $4x + 5$

[**f**] $4x - 5$

[**g**] $3x - 5$

[**h**] $3x + 2$

[DK]

17 If $S = \pi r^2 + 2\pi rh$, then h equals

[**a**] $\frac{S + \pi r^2}{2\pi r}$

[**b**] $\frac{S - \pi r^2}{2\pi r}$

[**c**] $S - \frac{r}{2}$

[**d**] $S - \pi r^2 - 2\pi r$

[DK]

18 The equation $3x^2 - 75x = 0$ has

[**e**] only one solution, 25

[**f**] two solutions, 0 and 5

[**g**] two solutions, 0 and 25

[**h**] three solutions, 0, +5, and −5

[DK]

19 If $2x + 3 > x - 1$, then

[**a**] $x > -4$

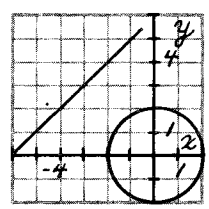
[**b**] $x > -2$

[**c**] $x > 2$

[**d**] $x > 4$

[DK]

20 The graphs whose equations are $x^2 + y^2 = 4$ and $x - y + 6 = 0$ are shown below. What is the common solution of the two equations?



[**e**] (−6, 0) and (0, 6)

[**f**] (0, 0)

[**g**] (2, 0), (0, 2), and (0, −2)

[**h**] There is none.

[DK]

21 What are the factors of $8x^3 + 27y^3$?

[**a**] $(2x + 3y)(4x^2 + 6xy + 9y^2)$

[**b**] $(2x + 3y)(2x^2 - xy + 3y^2)$

[**c**] $(2x + 3y)(4x^2 - 6xy + 9y^2)$

[**d**] $(2x + 3y)(4x^2 - 12xy + 9y^2)$

[DK]

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22 Which of the following facts would be applied in solving the equation $(x - a)(x - b)(x - c) = 0$?

[e] Both sides of an equation may be divided by any number except zero.

[f] The product of two or more factors is zero only if one or more factors is equal to zero.

[g] Both sides of an equation may be multiplied by any number.

[h] If equals are subtracted from equals, the results are equal.

[DK]

23 If log 3.62 is given as .5587 and log 3.63 as .5599, what is the approximate value of log 3.626?

[a] .5580

[b] .5592

[c] .5594

[d] .5595

[DK]

24 The fraction $\frac{x + 2i}{x - 3i}$ can be simplified by multiplying both numerator and denominator by

[e] $x - 3i$

[f] $x + 3$

[g] $x + 3i$

[h] $x + i$

[DK]

25 The roots of $2x^2 - 5x - 1 = 0$ are

[a] $\frac{5 \pm \sqrt{33}}{4}$

[b] $\frac{5 \pm \sqrt{17}}{4}$

[c] $\frac{-5 \pm \sqrt{33}}{44}$

[d] $\frac{-2 \pm \sqrt{33}}{4}$

[DK]

26 If $x + 2 = \sqrt{x^2 + 6}$, then x equals

[e] $-2\frac{1}{2}$

[f] $-\frac{1}{2}$

[g] $+\frac{1}{2}$

[h] $+2\frac{1}{2}$

[DK]

27 The sum of $|-4| + |+2|$ equals

[a] -6

[b] -2

[c] $+2$

[d] $+6$

[DK]

28 The expression $x + 7 = 7 + x$ illustrates the

[e] commutative property

[f] transitive property

[g] distributive property

[h] associative property

[DK]

29 In the system of real numbers, zero is called the

[a] additive inverse

[b] multiplicative identity

[c] reciprocal

[d] additive identity

[DK]

30 The slope of the line at the right is

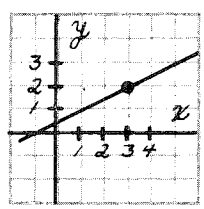
[e] $\frac{1}{4}$

[f] $\frac{1}{2}$

[g] 2

[h] 4

[DK]



31 If $A = \{1, 2, 3, 4\}$ and $B = \{1, 3\}$, then

[a] $A \subset B$

[b] $B \subset A$

[c] $A = B$

[d] B is the complement of A

[DK]

32 A geometric progression is one in which every term after the first is formed by

[e] adding all the terms preceding it

[f] subtracting a fixed number from the preceding term

[g] adding a fixed number to the preceding term

[h] multiplying the preceding term by a fixed number

[DK]

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33 Which one of the following points does *not* lie on the curve whose equation is $y = 2x^2 + x - 3$?

[**a**] (0, 3)

[**b**] (0, −3)

[**c**] (1, 0)

[**d**] (−1, −2)

[DK]

34 The expression $\dfrac{\frac{1}{a} + \frac{1}{b}}{\frac{2}{ab}}$ equals

[**e**] $\frac{a}{2} + b$

[**f**] $a + b$

[**g**] $\frac{a + b}{2}$

[**h**] $2(a + b)$

[DK]

35 How many permutations of 3 letters each may be made with the letters a, b, c, d?

[**a**] 3

[**b**] 4

[**c**] 6

[**d**] 24

[DK]

36 If $\frac{x}{y} = 5$, what is the value of $\frac{x - 4y}{y}$?

[**e**] $5 - 4y$

[**f**] y

[**g**] 1

[**h**] −1

[DK]

37 An example of the associative property is

[**a**] $(xy)z = x(yz)$

[**b**] $a + b = b + a$

[**c**] $ab = ba$

[**d**] $x(a + b) = xa + xb$

[DK]

38 In the process of solving $\sqrt{2x} - 1 = \sqrt{2x - 7}$ we get which of the following?

[**e**] $2x + 1 = 2x - 7$

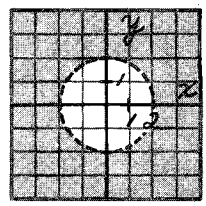
[**f**] $2x - 2\sqrt{2x} + 1 = 2x - 7$

[**g**] $4x^2 - 4x + 1 = 4x^2 - 28x + 49$

[**h**] $2x - 1 = 2x - 7$

[DK]

39 The graph below includes all the points outside but not on the circle. This is the graph of



[**a**] $x^2 + y^2 > 4$

[**b**] $x^2 + y^2 < 4$

[**c**] $x^2 + y^2 \geqq 4$

[**d**] $x^2 + y^2 \leqq 4$

[DK]

40 What is the range if the domain of the relationship $y = |x|$ is $\{-3, -2, -1, 0, 1, 2, 3\}$?

[**e**] $\{-3, -2, -1, 0, 1, 2, 3\}$

[**f**] {all real numbers less than 3}

[**g**] $\{0, 1, 2, 3\}$

[**h**] null set

[DK]

41 The product of $(a + bi)(2a - 3bi)$ equals

[**a**] $2a^2 + 3b^2 - abi$

[**b**] $2a^2 + 3b^2 + abi$

[**c**] $2a^2 - 3b^2 - abi$

[**d**] $2a^2 - 3b^2 + abi$

[DK]

42 $\dfrac{6 \pm \sqrt{36 - 24}}{4}$ can be expressed as

[**e**] $\frac{3 \pm \sqrt{12}}{2}$

[**f**] $\frac{3}{2} \pm \sqrt{3}$

[**g**] $\frac{3 \pm 2\sqrt{3}}{2}$

[**h**] $\frac{3 \pm \sqrt{3}}{2}$

[DK]

43 The roots of $ax^2 + bx + c = 0$ are not real if

[**a**] c is negative

[**b**] $b^2 - 4ac >$ zero

[**c**] $b^2 = 4ac$

[**d**] $b^2 - 4ac <$ zero

[DK]

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44 The sum of $\frac{x+1}{x-2}+\frac{x+2}{2-x}$ equals

[e] $\frac{1}{x-2}$

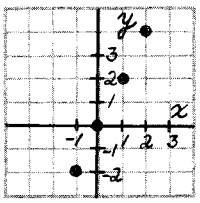
[f] $\frac{1}{2-x}$

[g] $\frac{2x+3}{x-2}$

[h] $\frac{x-3}{(x-2)^2}$

[DK]

45 The graph below consisting only of four points is the graph of $y = 2x$ where the domain of x is



[a] x real and $-1 \leqq x \leqq 2$

[b] $\{-2, 0, 2, 4\}$

[c] $\{-1, 0, 1, 2\}$

[d] x rational and $-1 \leqq x \leqq 2$

[DK]

46 Which of the following represents the value of y in the system of equations below?

$$2x - y + 3z = 8$$
$$x + y + z = 2$$
$$3x + 2y + z = 5$$

[e] $\begin{vmatrix} 2 & -1 & 3 \\ 1 & 1 & 1 \\ 3 & 2 & 1 \end{vmatrix} \Big/ \begin{vmatrix} 2 & 8 & 3 \\ 1 & 2 & 1 \\ 3 & 5 & 1 \end{vmatrix}$

[f] $\begin{vmatrix} 2 & 8 & 3 \\ 1 & 2 & 1 \\ 3 & 5 & 1 \end{vmatrix} \Big/ \begin{vmatrix} 2 & -1 & 3 \\ 1 & 1 & 1 \\ 3 & 2 & 1 \end{vmatrix}$

[g] $\begin{vmatrix} 2 & 8 & 3 \\ 1 & 2 & 1 \\ 3 & 5 & 1 \end{vmatrix}$

[h] $\begin{vmatrix} 2 & -1 & 3 \\ 1 & 1 & 1 \\ 3 & 2 & 1 \end{vmatrix} - \begin{vmatrix} 2 & 8 & 3 \\ 1 & 2 & 1 \\ 3 & 5 & 1 \end{vmatrix}$

[DK]

47 If x pencils cost m cents, the formula for the cost c of y pencils is

[a] $c = \frac{my}{x}$

[b] $c = \frac{mx}{y}$

[c] $c = mxy$

[d] $c = \frac{m}{x} + y$

[DK]

48 Use the factor theorem to determine which of the following is a factor of $x^3 - 5x^2 - 2x + 4$.

[e] $x + 2$

[f] $x - 2$

[g] $x - 1$

[h] $x + 1$

[DK]

49 The trigonometric ratio cosine of angle θ is defined as

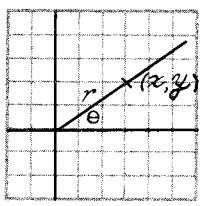
[a] $\frac{y}{r}$

[b] $\frac{x}{r}$

[c] $\frac{y}{x}$

[d] $\frac{r}{y}$

[DK]



50 If $S = \{1, 2, 3\}$ and $T = \{3, 4, 5\}$, then

[e] $5 \in S$

[f] $S \cup T = 3$

[g] $5 \in T$

[h] $S \cup T = T$

[DK]

STOP! GO BACK AND CHECK YOUR WORK

10

9

NAME_____
Last Name *First Name* *Initial*

MALE ☐ FEMALE ☐ GRADE_____ TEACHER_____

SCHOOL_____ DATE OF TESTING_____
Year *Month* *Day*

CITY OR TOWN_____ DATE OF BIRTH_____
Year *Month* *Day*

STATE_____ AGE_____
Years *Months*

SCORE BOX	RAW SCORE	STAND. SCORE	%-ILE RANK	STANINE

NORMS POPULATION_____

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